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AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

WILLIAMS (L. H.), WILDMAN (O.) & CURTIS (Lee F.). **Amoebiases in Haiti.**—*U.S. Nav. Med. Bull.* 1929. Apr. Vol. 27. No. 2. pp. 331–335. [3 refs.]

The negro population of Haiti are carriers and without idea of sanitation, and amoebiasis is endemic and widespread. Children become infected even before weaned from the breast. Over a 2 year period the records of the laboratory showed 16·26 per cent. of *E. histolytica* infection in hospital patients—examination of specimens without and with use of Lugol's solution. Latterly, on adopting Craig's sedimentation of cysts technique 42·8 per cent. positive cysts have been obtained (42 specimens.) This technique gave :—

Among 50 members U.S. Marine Corps in Cape Haitien Barracks 5 per cent. *E. histolytica* ; 5 *E. coli* ; 10 *Giardia lamblia.*

Among 50 native gendarmes in barracks, Cape Haitien, 44 per cent. *E. histolytica* ; 51 *E. coli* ; 13 *Endolimax nana* ; 5 *Iodamoeba bütschlii* ; "1·9" *Chilomastix mesnili* ; 25 per cent. *Giardia lamblia.*

Ascaris lumbricoides ova were found in 5 per cent. of the Marines and in 50 per cent. of the gendarmes. Hookworm ova in no marine, and in 17 per cent. of the gendarmes.

In spite of 5·8 per cent. of "acute amoebic dysentery" in hospitalized native patients, amoebic abscess of liver is strikingly rare. The authors have encountered only one such case, diagnosed apparently on clinical grounds only, cured by medical treatment.

In treatment of dysentery emetine hydrochlor. has been only partially successful. Yatren by mouth and by enemata proved more successful in relieving pain and eradicating vegetative and encysted amoebae : but it caused such severe diarrhoea that in many cases it had to be withheld and emetine given instead. 'Paroxyl' (p-oxy-m-acetylamino-phenylarsenic acid) proved of greatest value, especially when given with bismuth subnitrate. Its dose is a 4 grain tablet three or four times daily ; bismuth subnitrate one teaspoonful in water four times daily. One fairly severe case of arsenical poisoning [? dermatitis ; ? jaundice] occurred; intravenous sodium thiosulphate was quickly effective. Rest in bed is not essential but advantageous in the acute stage.

H. M. Hanschell.

(5701) P6/18 1,750 11/29 H & Sp G λ 52

WILLIAMSON (Charles Spencer), KAPLAN (Bertha) & GEIGER (J. C.). **A Survey of Amebic Dysentery in Chicago.**—*Jl. Amer. Med. Assoc.* 1929. Feb. 16. Vol. 92. No. 7. pp. 528–531. [College of Med., Univ. of Illinois, & Dept. of Health, Chicago.]

This investigation followed on the recognition of cases of amoebic dysentery among the staff of a hotel.

1. Protozoa found in 1,148 Food Handlers.

Endamoeba histolytica ...	27 carriers (2 active cases) ...	2·35 per cent.
E. coli	220 carriers ...	19·16 ,,
Endolimax nana	23 ,, ...	2 ,,
Iodamoeba bütschlii ...	61 ,, ...	5·31 ,,
Trichomonas intestinalis...	21 ,, ...	1·82 ,,
Chilomastix mesnili ...	22 ,, ...	1·91 ,,
Giardia intestinalis ...	75 ,, ...	6·53 ,,

2. Parasitic infections among 380 other Normal Persons taken at random.

E. histolytica	4 carriers (2 active cases) ...	1·05 per cent.
E. coli	31 carriers ...	8·10 ,,
Endolimax nana	3 ,, ...	0·78 ,,
Iodamoeba bütschlii ...	7 ,, ...	1·66 ,,
Trichomonas intestinalis...	4 ,, ...	1·05 ,,
Chilomastix mesnili ...	6 ,, ...	1·57 ,,
Giardia intestinalis ...	7 ,, ...	1·66 ,,
Trichuris trichiura ...	4 ,, ...	1·05 ,,
Oxyuris vermicularis ...	2 ,, ...	0·52 ,,
Taenia saginata	2 ,, ...	0·52 ,,

H. M. H.

TER POORTEN (F. H.). Beitrag zur Kenntnis der Darmprotozoen in den Niederlanden, insbesondere der *Entamoeba histolytica.* [**Intestinal Protozoa in the Netherlands, especially** *E. histolytica.*]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Dec. 4. Vol. 109. No. 7/8. pp. 406–416. With 1 chart in text. [20 refs.]

This paper gives the results of a long and careful investigation. The author recounts, and tabulates the findings, investigations by various workers since 1914 in Germany, England, France, Holland, into the incidence of *E. histolytica* infections in those countries: all of which have received review in this *Bulletin.* He remarks that for 100 years Holland has been in regular contact with the tropics, giving continual importation of *E. histolytica* from the tropics. He has investigated its incidence in Holland in apparently healthy persons only; his findings are classified, analysed and set out in tabular form. His technique is carefully set out, and the morphology of the amoebae found is discussed. As example, one set of findings may be given. The stools of 469 apparently healthy naval men (petty officers, seamen and stokers) returned to Holland after service in the squadron in the Dutch East Indies, were examined, between December, 1925 and March, 1927.

Infected with *E. histolytica*	43
,, ,, *E. coli*	50
,, ,, *E. tenuis*	12
,, ,, *E. nana*	62
,, ,, Iodcysts	30
,, ,, *Lamblia intest.*	31
,, ,, Blastocysts	122

The author notes that English workers do not recognize *E. tenuis* as a separate species, but describe it as a "small strain" of *E. histolytica.* The fleet base in the East Indies is Soerabaja where to-day there is not much amoebic dysentery. In Batavia FLU (1919) found 10·5 per cent.; and BRUG (1920) 12·7 per cent. of the inhabitants not suffering from bowel disease to be carriers of *E. histolytica.*

H. M. H.

REVUE DE MÉDECINE ET D'HYGIÈNE TROPICALES.] 1929. May–June. Vol. 21. No. 3 (Numéro consacré à l'amibiase). [**Amoebiasis.**] [TRABAUD; PANAYOTATOU; PETRIDIS; LECERCLE; TRABAUD & SABBAGH; ABD EL KADER EL SABBAGH; KHOURI.]

Eleven papers. Two on intestinal and appendicular, and one on hepatic amoebiasis; they are interesting but break no new ground. Seven papers chronicle, mostly with enthusiasm, the respective authors' sincere belief in certain other forms of amoebiasis, viz.—latent amoebiasis, amoebihaemia, amoebic bronchitis, amoebic tonsillitis, amoebic peritonitis, and cite clinical cases in claimed support; which in fact give no real grounds whatever in support of the diagnosis. The antiseptic that may check this ferment is in the last paper. Had it been the first the rest could hardly have been published with it

In this Dr. J. KHOURI of Alexandria writes on "*Quelques considérations sur l'amibiase en Egypte.*" His paper is of great interest and great service. He had already recorded the very great decrease in cases of amoebic dysentery and liver abscess in Egypt since the introduction of emetine therapy: and that, as in other countries, dysentery was the most common morbid manifestation of infection with *Entamoeba histolytica* and *E. minuta.* He notes that since 1923 records have appeared, with increasing frequency, of infection of bladder, kidney, lungs, with the dysentery amoeba, especially in Alexandria. During 25 years, up to 1924, in Egypt, he has examined among 50,000 urines that of 591 patients with haematuria (bilharziasis, filariasis, calculus). In 4 per cent. only did the etiology remain obscure. For the last 5 years in Alexandria he has looked out especially for cases of vesico-renal and pulmonary amoebic infection. For example, in 2 haematuria cases, the diagnosis of vesical amoebiasis ("A. histolytique") has been made after a microscopical examination of the urine. In neither the fresh nor centrifuged urine of either case has he found any amoebae. One was a case of neoplasm (confirmed by radioscopy) and the other bilharziasis. In this last emetine therapy was followed by clinical improvement without altering in any way the histological picture of the urinary deposit. In these cases, as in most of the urinary and bronchitic secretions he has examined, certain cellular forms were found. They are round, with well defined outline, sometimes with inclusions which may be red blood corpuscles. They show sometimes a slow 'amoeboid' movement without actual locomotion; or turn on themselves displaying a different aspect in each position—hyaline rim; granular protoplasm; red blood corpuscles or other inclusions. They thus resemble encysted or precystic amoebae: but are in fact large mononuclear phagocytes, as is evident on critical examination, and *above all on staining by iron haematoxylin,* and if need be *by culture on appropriate media.* These cells he has frequently found in many cases

of purulent cystitis ; bilharzial and ' non-parasitic ' haematuria ; pyelitis ; occurring in patients suffering also from recurrent amoebic dysentery : in these cases these cells had been diagnosed in other laboratories as amoebae. In none of this material has he succeeded in finding a true amoeba. Similarly in sputa he has often failed to find the amoebae reported as present by colleagues. In one case, suspected by a colleague to be suffering from the bronchial spirochaetosis of Castellani, he had found an amoeba in the sputa. Dr. Khouri describes this amoeba very fully, and shows that its morphology was that of *A. gingivalis*. It has no characteristic of *histolytica*.

On the matter, then, of "*l'amibiase vesico-renale et l'amibiase bronchique,*" Dr. Khouri's first hand and extensive observations—sharpened, as he makes clear in this paper, by frequent and sometimes warm disagreement on the very point with colleagues in Alexandria, have led him to conclude that :—

(1) "Manifestations vésico-rénales et pulmonaires de l'amibe dysentérique" are at least extremely rare, even in Alexandria where they have been so frequently described.

(2) The absence of amoebae and amoebic cysts in urine and sputa when searched for in his laboratory by "les moyens les plus accrédités," when others elsewhere had reported in the same material their presence, sometimes in abundance ; or when the patients had been diagnosed as suffering from amoebiasis because clinical improvement had followed on emetine therapy—shows the numerous confusions from which "les analystes et les cliniciens" suffer in diagnosing as amoebic cases which in fact are not amoebic.

(3) Even in the rare cases where a true amoeba was found, no scientific proof has been (except even more rarely) put forward to establish the species, or the pathogenic nature of the amoeba incriminated as cause of the observed affection.

[At this day no one can dispute with Dr. Khouri that "les moyens les plus accrédités" might be known to and employed by all "analystes et cliniciens."]*

H. M. H.

SCHRUMPF-PIERRON. De l'hépatite amibienne chronique à récidives périodiques. [**Chronic Amoebic Hepatitis with Periodical Relapses.**] —*Rev. Méd.-Chirurg. des Maladies du Foie.* Paris. 1929. Mar.–Apr. Vol. 4. No. 2. pp. 170–174. With 2 text figs.

The subject is briefly yet adequately discussed : illustrative clinical examples are cited. The author's conclusions are :—

(1) The dysentery amoeba may invade the liver *primarily* without signs of enteritis ; and *secondarily*, as a complication of amoebic enteritis.

(2) Amoebic hepatitis is a chronic complaint ; with long periods of remission alternating with periodic development of painless and afebrile simple hepatic congestion which may at times increase to an acute diffuse painful and febrile hepatitis.

(3) The acute attacks are brought on often by sudden rise of external temperature, or by alcoholic excess.

(4) The only efficacious treatment is by emetine.

(5) It is improbable that cure is ever complete ; there remains the chronic infection with periodic acute relapses.

H. M. H.

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* See also below, p. 881.

YOSHITAKE (Seigo). [**On 45 Cases of Liver Abscess.**]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. Mar. No. 288. [In Japanese. English summary pp. 18–19.] [Govt. Hosp., Taihoku.]

The author states that liver abscess occurs less frequently in Formosa now than formerly. In the last 17 years 61 cases have been observed in the Government Hospital, Taihoku; 45 of these have been especially studied.

In 35 so-called tropical abscess of liver he has found amoebas only 9 times, most often in connexion with amoebic dysentery; average mortality 20 per cent. He has seen 9 cases of liver abscess caused by other micro-organisms with mortality 80–90 per cent. In treatment of amoebic abscess, though good effect of emetine was beyond dispute, yet operation was necessary for large abscesses; in 16 cases laparotomy; in 28 cases transpleural laparotomy after removal of one rib. Emetine injections immediately after operation.

H. M. H.

MOREL (Ch.) & TAPIE (Jean). La forme anémique de l'hépatite amibienne suppurée. [**Anaemic Form of Amoebic Liver Abscess.**]—*Rev. Méd.-Chirurg. des Maladies du Foie.* Paris. 1926. Oct.–Dec. Vol. 1. No. 4. pp. 418–430. [9 refs.]

The authors by way of introduction translate and yet echo MANSON—where liver abscess is concerned "le grand secret d'un diagnostic heureux est surtout d'y penser."

They set out in great detail their careful study of a case in which the clinical syndrome was that of a profound anaemia and wasting. The red blood cells at one period had fallen to 1,850,000 with many haematoblasts. The liver was enlarged to three fingers' breadths below costal margin. Exploratory puncture withdrew a drop of pus. Later, open operation and evacuation of a litre of pus from deep in liver: emetine injections: complete recovery: on leaving hospital red blood corpuscles 4,000,000.

H. M. H.

PUCHULU (Félix). Curación por vómica de un absceso amebiano del higado. [**Amoebic Abscess of the Liver cured by Spontaneous Emesis.**]—*Semana Méd.* 1929. July 11. Vol. 36. No. 28 (1852). pp. 74–75. [11 refs.]

A woman, 27 years of age, presented signs of liver abscess in the right upper lobe. Thirteen days later she vomited 150 cc. of viscid, chocolate-coloured pus, and 48 hours later had a similar emesis. (No entamoebae found in the pus.) Thereupon temperature dropped and general state improved; four months later blood was normal and radioscopy showed liver had returned to its normal size. Treatment consisted of anti-pyogenous vaccines before the evacuation of the abscess; and emetine and neosalvarsan afterwards.

H. Harold Scott.

MANSON-BAHR (Philip) & WILLOUGHBY (Hugh). **On the Leucocyte Count in Liver Abscess.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Mar. 9. Vol. 22. No. 5. pp. 465–467. [2 refs.]

In the series of twenty cases here recorded, taken in sequence as they occurred, the highest total leucocyte count was 25,000, the lowest

7,500, the average 15,000. Moreover, it was in those cases with lowest total leucocyte count that the largest liver abscesses were found; these last are the more chronic ones. Leonard ROGERS (1921) has made it plain that it is only with the multiple (generally fatal) liver abscess that counts as high as 35–38 thousand are recorded. The authors' figures agree with those of ROGERS in so far that relative proportion of polymorphonuclear cell count is of diagnostic and prognostic importance—increase of these cells is less marked than in bacterial infections. In one case in this series it was 35 per cent., in 12 cases 70 per cent. or over, and in one acute case only was it as high as 88 per cent. Lymphocytes in one case 8 per cent.: in 5 cases 38 per cent. or over, average 22 per cent. Large mononuclears in no case above 10 per cent., average 6 per cent. Eosinophiles in eight cases were absent, in the others between 1 and 6 per cent. Reduction in red blood cells and in haemoglobin occurred usually only in long standing cases with corresponding prolonged septic absorption. In only one case did anaemia approach Addisonian type. Among these 20 cases 3 deaths occurred—15 per cent. mortality.

H. M. H.

COLE (Warren H.) & HEIDEMAN (Milo L.). **Amebic Ulcer of the Abdominal Wall following Appendectomy with Drainage.**—*Jl. Amer. Med. Assoc.* 1929. Feb. 16. Vol. 92. No. 7. pp. 537–540. With 5 text figs. [7 refs.] [Washington Univ. School of Med., & Barnes Hosp., St. Louis.]

A spreading ulcer of abdominal wall followed appendectomy with drainage. Much emetine treatment had little or no effect on the ulcer, which was eventually extirpated by cautery excision. No amoebae were found in the patient's stools and there was no history of dysentery.

In the ulcer pus very many "amoebas" were found. They are described as being sluggishly motile; 25 microns in diameter; granular protoplasm much vacuolated; protoplasm in some glassy; pseudopodia; nuclei 4 to 7 microns in diameter containing chromatin bodies as well as coarse granular material. "Particles of red blood cells were occasionally seen in the protoplasm; a few of the organisms were round or oval, small and without pseudopodia; these probably represented the encysted form." The organisms, however, found in stained sections from skin edge of sloughing portion of ulcer were of "relatively small size with round or oval shape" indicating "probably that practically all were of the encysted form." Frequently the amoebas were engorged with lymphocytes and even polymorphonuclear leucocytes in large numbers, with only a few fragmented erythrocytes. "An ordinary haematoxylin and eosin stain yielded satisfactory staining of the amoebas. Giemsa and polychrome methylene blue were slightly less satisfactory."

[The paper is illustrated by photomicrographs which do not illustrate anything to the point, and by a drawing of pseudopodia. These "amoebas" are plainly phagocytic large mononuclear tissue cells. Among the seven references is none to any of the records where true amoebic ulceration of skin has been demonstrated.]

H. M. H.

MANSON-BAHR (Philip H.). **On a Case of Acute Amoebiasis.**—*Trans. Roy. Soc. Trop. Med & Hyg.* 1929. Mar. 9. Vol. 22. No. 5. pp. 447–450. With 3 figs. on 2 plates. [3 refs.]

The author states that acute amoebic dysentery in man, commencing with sudden onset and fulminating in course, is rare. In an extensive

experience in the World War he had seen only three such cases. The case here described (and well illustrated) resembled in toxic manifestations an infection by dysentery bacillus.

A ship's carpenter, who had been sailing to India for many years, complained of subacute abdominal pains, mainly in left hypochondrium and lumbar region. Thirty-six hours later he was passing numerous brown evil-smelling stools. The pyrexia, stupor and diarrhoea suggested typhoid. Ten days later (when seen by the author) he was in collapsed condition. Abdomen extremely tender especially over caecum. Meteorism marked. Liver not tender nor enlarged. Liquid dark-brown faeces flecked with blood and mucus in which were found free forms of *E. histolytica*. Leucocytosis 16,200 rising to 24,000 before death. The serum agglutinated paratyphoid B. in 1–180 dilution; no reason could be found for this. Emetine injections were ineffectual; the patient died two days later from intense intoxication.

Autopsy—directly after death revealed: adhesions between stomach and under surface of liver; pus exuded from burst abscess in left lobe of liver; very friable colon of dark plum colour; mucosa of caecum bluish black; in places mucosa of transverse colon showed gangrene, the dark "Dyak-hair sloughs" [pleasant variant on the more usual medical food-simile nomenclature] exposing the muscle. Perforation had occurred in places. Mucosa of small intestine quite normal. Liver not enlarged but contained three ragged abscesses in right and one in left lobe. In the pus motile *E. histolytica* which were successfully cultivated in Boeck-Drbohlav medium. Pure *Bact. coli* cultured from inferior vena cava and right heart.

Microscopically—Colon, almost uniform coagulation necrosis of mucosa, containing vegetative amoebae. Fewer amoebae in submucosa, in partially thrombosed submucosal veins and amongst fibres of circular and longitudinal muscles. Most of the amoebae were the large tissue-invading forms with prominent nuclei; some with ingested red blood corpuscles. Liver sections showed zone of intense hyperaemia surrounding one of necrosis; only in border line between these two could amoebae be recognized. They were found in colonies, as many as 27 in one field of microscope.

The author points out that the macroscopic and microscopic necropsy findings in this case are identical with those found in kittens dying after infection with *E. histolytica*. In them also death occurs from *Bact. coli* septicaemia supervening on the necrosis of the amoeba-infected gut. Emetine hydrochlor. fails also to save the kitten.

H. M. H.

SANFILIPPO (Emanuele). Ancora sulle sindromi appendicolari di origine amebica. [**Symptoms of Appendicitis of Amoebic Origin.**]—*Riforma Med.* 1929. Apr. 20. Vol. 45. No. 16. pp. 525–527. [12 refs.] [Inst. of Clin. Med., Univ., Catania.]

Four cases are recorded in detail, only one of which is at all convincing. This was a man of 23 years with symptoms of appendicitis; *Entamoeba histolytica* was found in the faeces. Appendicectomy was performed and when the viscus was examined microscopically "sparse cystic forms" were seen in a small vacuole in the wall.

H. Harold Scott.

CHATTERJI (K. K.). **A Consideration of Surgical Complications of Chronic and Latent Amoebiasis.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 1. pp. 233–238. With 9 figs. on 5 plates.

The author in an interesting paper briefly describes cases occurring in his practice where laparotomy had revealed duodenal obstruction

due to adhesion bands, causing kinking of duodenum and stomach; adhesions covering gall bladder and binding it to duodenum; adhesions covering surface of liver; adhesions kinking caecum and attaching it to small intestine.

In all these patients (Indian and European) there was a history of colitis or dysentery in the past; sigmoidoscopy revealed ulceration of rectum; and vegetative or encysted *Entamoeba histolytica* were found in the stools.

[It is clear then that the patients were all infected with amoebae, but the author does not make it clear that the surgical conditions here described were the outcome of the infection with *E. histolytica.*]

H. M. H.

TEITEL (D.). Zur Frage der Behandlung der Amöbendysenterie bei Säuglingen. [**Treatment of Amoebic Dysentery in Infants.**]—*Wien. Klin. Woch.* 1929. Feb. 21. Vol. 42. No. 8. pp. 235–237. [14 refs.]

The author gives an interesting and full account of his treatment of 520 cases of amoebic dysentery in infants and young children in Palestine. The diagnosis was made as result of microscopical examination of stools, and he was able to follow up results of treatment for two to three months after its cessation. Analysis of his results leads him to conclude that:—

(1) Emetine is the best drug for amoebic dysentery in children. He has observed no toxic effects.

(2) Rivanol or yatren solutions, as enemata, are valuable adjuvants.

(3) As a winding up of treatment, and to destroy cysts, spirocid and stovarsol are effective. They must be given in small doses (0·005–0·03 gm.) and never at the same time as emetine.

(4) The best treatment proved to be a combined one—emetine in the beginning with at the same time enemata of rivanol or yatren solution: and at the end small doses of spirocid or stovarsol alone.

H. M. H.

BEIHEFTE ZUM ARCHIV FÜR SCHIFFS- UND TROPEN-HYGIENE. 1928. Vol. 32. No. 4. pp. 5–40 [159–194].—Rivanol bei Amöben-Dysenterie. [**Rivanol in Amoebic Dysentery.**] i. WAGNER (O.). Untersuchungen ueber die experimentelle Chemotherapie der Amöbenruhr. pp. 5–15 [159–169.] [22 refs.] ["I. G. Farbenindustrie-Aktien Gesellschaft," Höchst a. M.] ii. SCHAUMANN (O). Ueber die spasmolytische Wirksamkeit des Rivanols. pp. 16–21 [170–175.] With 3 charts in text. [12 refs.] ["I.G. Farb.-Akt. Gesell.," Höchst a. M.] iii. PETER (F. M.). Die interne Rivanolbehandlung der Amöben-Dysenterie. pp. 22–40 [176–194.] With 4 charts in text. [7 refs.] [Works Hosp., Surinam Bauxite Co., Moengo, Dutch West Indies.]

This number is devoted to studies on the action of rivanol (2 *Aethoxy*–6, 9 *diaminoacridinlactate*) on the amoebae of dysentery and on the animal (cat and man) suffering from amoebic dysentery.

i. Dr. Wagner records his experiments and observations, on *in vitro* cultures of *Entamoeba histolytica* and on infected kittens. Control observations were made on infected kittens treated with trypaflavin, arsen-akridin and yatren; and with these drugs and with emetine, on *E.*

histolytica in vitro cultures. His results in the *in vitro* culture tests favoured rivanol as an amoebicide. A 1–1,000 solution of rivanol killed all amoebae in 20–24 hours. This result was given by trypaflavin and arsen-akridin, only in dilutions of 1–250 ; by yatren in 1–50; and by emetine in 1–100. All the experimentally infected kittens died eventually, but the advantage [slight, as revealed by the tabulated experimental data] lay with the rivanol solutions in that there was a quicker disappearance of amoebae from stools and a longer post-infection life in the rivanol treated kittens. The most effective rivanol dilutions were apparently 1 : 1250 to 1 : 500.

ii. Dr. Schaumann records his experiments on the gut of the rat and rabbit, the results of which demonstrate that rivanol has an antispasmodic action on the unstriped muscle of the gut, approximately equivalent to that of papaverin.

iii. Dr. Peter states that following URCH's report (1926) on the beneficial result of rivanol clysma in amoebic dysentery, he too recorded (1927) its curative action in a series of such case microscopically confirmed and controlled. Besides its apparently direct action on the parasite he then noted its rapid effect in causing cessation of pain and tenesmus, and the stools became faeculent and formed. The drug had a definite anaesthetic action. He now records in detail and at length his further observations on a series of 34 patients under his care in Moengo, Dutch Guiana. *E. histolytica* was demonstrated in each of these cases. Some were severe primary cases, others more or less chronic, and some had already been treated with emetine or emetine-yatren without success. They were given rivanol by mouth in single doses of 30 to 50 mgm. (small children about 1-10 of this dose), three times, or oftener, a day, for periods varying with the patient up to 9 days : a few of the patients had rectal clysma of rivanol, 1–3,000 to 1–5,000, as well. In all cases *E. histolytica* disappeared from stools in 3 to 4 days ; in a few in 6 to 7 days. The tabulated data show that parasites were not detected in one case 14 days, in one case 1 month, in two cases 2 months, after cessation of treatment. Four patients were treated successfully with rivanol as ambulant cases. In all cases the exhibition of rivanol *per os* was quickly followed by cessation of pain and tenesmus, by disappearance of blood and mucus from stools, by cessation of frequency of defaecation, and by stools becoming faeculent and formed. No toxic effects were noted. The author claims that results in this series establish that rivanol destroys both vegetative and resistant encysted forms of the parasite, and that its effect on the gut is antispasmodic and anaesthetic.

[While these careful clinical observations have an importance that needs no stressing, the absence of concurrent controls renders them of small value.]

H. M. H.

GESSNER (Otto). Ueber die Darmwirkung von Rivanol, Yatren und Emetin. (Zugleich Bemerkung zu der Arbeit von Schaumann: Ueber die spasmolytische Wirksamkeit des Rivanols, s. diese Zeitschrift, Beihefte, 1928, Bd. 32, Nr. 4, S.16–21). [**Intestinal Action of Rivanol, Yatren and Emetine.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. May. Vol. 33. No. 5. pp. 277–281. [9 refs.] [Pharmacol. Inst., Univ., Marburg.]

An account of laboratory experimental observations on the action of these drugs.

Rivanol. The author criticizes SCHAUMANN's work on the ground of faulty experimental technique, and rejects his findings.

Emetine. On the still-living gut of guineapig and rat acts by lowering tonus and inhibiting rhythmical movements as in the pilocarpin treated gut.

Yatren acts as a stimulant to the gut, exciting peristalsis in dilution 1 : 100 ; sometimes, however, in still greater concentration it tends to produce paresis of gut. It is much less toxic than rivanol ; and its use in the acute stage of amoebic dysentery ensures a beneficial clearing out of the gut contents.

H. M. H.

DE MELLO (Froilano) & DA CRUZ (L. J. C.). Résultats du traitement expérimental de divers états d'amebiase intestinale par le *Yatren purissimum.* [**Results of Treatment of Intestinal Amoebiasis by Yatren.**]—*Arquivos da Escola Med.-Cirurg. de Nova Goa.* 1929. Ser. A. No. 4. pp. 539–564. [39 refs.]

A full and detailed account of clinical and parasitological observations. Six acute, 4 subacute, and 5 chronic cases were treated.

The authors' conclusions are emphatically in favour of Yatren purissimum as the drug of choice in treatment of amoebic dysentery.

H. M. H.

FISCHER (Otto). Ein mit Yatren geheilter Fall von Amöbenhepatitis. [**Amoebic Hepatitis treated by Yatren.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 326–327. [6 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author notes that hitherto emetine has held its own as the therapy of choice for amoebic hepatitis with or without abscess formation. The case here recorded had suffered for 2 months from diarrhoea with bloody stools and fever. He was found to be wasted, with acute pain and tenderness over liver region. The liver was enlarged and the abdominal wall inflamed. The muco-sanguineous stools contained many typical dysentery amoebae. There was anaemia and a leucocyte count of 17,000. There was intermittent fever. Treatment was by yatren clysters—and later by pills *per os*. Symptoms and physical signs rapidly vanished. Amoebae, blood and mucus disappeared from stools. The patient gained in weight, and the leucocyte count sank to 8,000. On the third day the temperature was normal.

H. M. H.

FORBES-BROWN. **Yatren in Dysentery.**—*Jl. Port-of-Spain Med. Soc.* 1927. pp. 174–175.

Recommends E.B.I. orally with Yatren 105 rectally, as the most effective treatment for chronic relapsing amoebic dysentery; and cites in support of his own experience to this effect, the practice of the London and Liverpool Schools of Tropical Medicine.

H. M. H.

NASSET (Elizabeth Custer) & KOFOID (Charles A.). **The Effects of Radium and of Radium in Combination with Metallic Sensitizers on** *Endamoeba dysenteriae* **in Vitro.**—*Univ. California Public. Zool.* 1928. Nov. 8. Vol. 31. No. 17. pp. 387–416. With 7 text figs. & 14 figs. on 2 plates. [36 refs.]

The experiments are fully described and discussed.

The authors' summary and conclusions are :—

" 1. The division rate of *Endamoeba dysenteriae in vitro* is stimulated from two to four times over that of the controls by exposure to radium radiations.

"2. The stimulation continues for not more than 24 hours after the removal of the radium and is followed by a decided retardation of the division rate.

"3. Screening out the beta rays with aluminum does not remove the stimulative effect although stimulation may not be so marked as when unscreened radiations are employed.

"4. The after effect of radiation on retardation in division rate is not so prominent when the beta rays are removed.

"5. Radiated cultures bear transplanting indefinitely. If death did occur it might be ascribed either to the direct effect of the radiations on the amoebae, or to the modifications induced by the radiations on certain bacteria related to the growth of the amoebae.

"6. Radium produces morphological changes in amoebae in cultures, the most conspicuous being in the structure of the nucleus. Irradiated amoebae may increase in size, enucleation or autotomy may occur, and the nuclear chromatin may become homogeneous or disintegrated.

"7. A large amount of radium acting for a short time produces more striking morphological changes than a smaller amount acting for a longer time.

"8. Gamma radiations are capable of producing characteristic changes in morphology.

"9. The effects of radiation persist for four to six days after the removal of the radium and then the culture gradually returns to normal.

"10. The remarkable resistance of *Endamoeba dysenteriae* to radium *in vitro* does not suggest the use of this agent in treating cases of human amoebiasis. The response of *E. dysenteriae in vivo* to radium may prove to be of a different order from that *in vitro* . . .

"11. *Endamoeba dysenteriae in vitro* is killed when exposed to radium in combination with sub-lethal dilutions of mercuric or lead chloride (1–50,000). This effect may be due to the absorption of the metal by the amoebae and the production of secondary radiations, or to radiationless transfer."

H. M. H.

MANSON-BAHR (P. H.) & KILNER (T. Pomfret). **Irrigation of Amoebic Abscess Cavities by the Carrel-Dakin Method.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Jan. 30. Vol. 22. No. 4. pp. 339–341. [3 refs.]

If aspiration of liver abscess pus and subsequent treatment by emetine injections is the ideal procedure, yet in some cases (MANSON-BAHR and MORRIS, 1926) it does not arrest suppuration and extirpate amoebae from liver; free opening and drainage may have to be resorted to, but even this may fail without continuous irrigation of abscess cavity to ensure complete evacuation of amoeba-laden débris and promote granulation. Carrel Dakin method fulfils these conditions.

Case I—recurrent dysentery for five years. He had had emetine hypodermically—72 grs. in first course, 24 grs. in second, and in third course emetine-bismuth-iodide tablets for 24 days. As judged by ordinary standards he was thoroughly dosed with emetine, which had not prevented formation of a large hepatic abscess: no free or encysted *E. histolytica* were found in faeces. Aspiration of liver abscess gave on first occasion 10 oz. of pus, on second 8 oz., on third 6 oz. After four weeks there being no improvement open operation was performed—large quantity of thick liver pus escaped; Carrel's tube inserted and irrigation with Dakin's solution two-hourly for nineteen days. To extirpate amoebic infection prolonged after course of E.B.I. and yatren lavage (MANSON-BAHR and SAYERS, 1927). The patient had remained permanently cured.

Case II—relapses of dysentery since contracting it in 1916 in India. Frequent intensive courses of emetine injections, and pills. Pains right shoulder and right chest: transpleural open operation with resection of rib, much pus evacuated, subsequent treatment with emetine injections and E.B.I. Nevertheless, when first seen by the authors, reaccumulation of pus, numerous active *E. histolytica* in faeces, grave anaemia, fever: open operation, evacuation of 3 pints of pus under pressure. Carrel-Dakin irrigation, and E.B.I. and yatren lavage as in Case I. Amoebic infection of intestinal canal was extirpated; no further dysenteric symptoms had occurred; patient had remained well. Rapid recovery from the grave anaemia was aided by daily doses of liver extract. The authors note that in both cases the physical improvement after institution of Carrel-Dakin irrigation was very evident.

H. M. Hanschell.

Brulé, Laporte & Ragu. Deux cas d'abcès pulmonaires, non amibiens, rapidement améliorés par le traitement émétinien. [**Two Cases of Non-Amoebic Pulmonary Abscess cured by Emetine.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1929. June 10. Year 45. 3rd Ser. No. 19. pp. 699–708. [8 refs.]

The authors give full clinical descriptions of these two cases. The pulmonary abscess was a sequela of influenza. In neither case did history or laboratory examinations reveal amoebiasis. They find the action of emetine hydrochlor. hypodermic injections in these two cases of pulmonary abscess difficult to interpret, but of its decisive beneficial therapeutic effect these cases leave no doubt.

[Again the still needed record that clinical cure after emetine therapy does not support a diagnosis of amoebiasis.]

H. M. H.

Laederich (L.) & Poumeau-Delille (G.). Un cas d'abcès du poumon guéri par l'émétine. [**Abscess of Lung cured by Emetine.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1929. Feb. 25. Year 45. 3rd Ser. No. 6. pp. 295–298.

The condition was acute in onset: radioscopy revealed abscess in the *upper* lobe of the right lung. The sputum was mucopurulent, not blood stained. Fever rapidly disappeared and the lesion in lung quickly resolved, after treatment by emetine intravenous injections. There was no history of previous dysentery. Over 21 years previously the patient had spent two years in various parts of Algeria.

The authors refuse [refreshingly] to pronounce this case amoebic because of its rapid cure by emetine. They point out that emetine has a beneficial effect on suppurative conditions apart from those caused by amoebae.

H. M. H.

Scuderi (Giovanni) & Baroni (Benigno). Esiste una amebiasi pleurica? A proposito di un caso di raccolta parietale della pleura sinistra con presenza di forme vegetative di *Entamoeba histolytica.* Parte prima—Discussione clinica [Scuderi]. Parte seconda—Ricerche anatomo-isto-patologiche [Baroni]. [**A Left-sided Pleuritic Effusion containing Vegetative Forms of** *Entamoeba histolytica.*]—*Giorn. di Batteriol. e Immunol.* Turin. 1928. Aug. Vol. 3. No. 8. pp. 540–555. With 5 figs. [8 refs.]

A man of 24 years had suffered five years previously with an attack of muco-sanguineous diarrhoea lasting two days. Four years later, left-sided pneumonia terminating by crisis on the seventh day. Two months later

attacks of slight haemoptysis, followed by shivering and signs of pleurisy. Aspiration withdrew an odourless, chocolate-coloured fluid, like liver-pus, containing motile amoebae ; operation.

The author states that there are three possibilities explaining the condition : (1) Primary localization of the *E. histolytica* in the pleura ; (2) Conveyance by lymphatics from the lung or some subdiaphragmatic focus ; (3) Rupture into the pleura from a collection of pus in the lung or abdomen. There was no evidence of hepatic involvement and a fragment of the parietal pleura examined histologically revealed many entamoebae throughout its thickness and in the underlying tissue. They were also found in the faeces after a purgative. Hence it is inferred that they were conveyed metastatically to the pleura.

H. Harold Scott.

KHOURI (J.). Sur un cas d'hématurie avec présence d'amibes (?) dans les urines. [**Case of Haematuria with (?) Amoebae in the Urine.**]—*Bull. Soc. Path. Exot.* 1929. Mar. 13. Vol. 22. No. 3. pp. 158–162.

The patient, a native of Egypt, when 28 years old, suffered from dysentery followed by liver abscess. When 15 years old he had acquired syphilis and later gonorrhea. Eight years after the operation for liver abscess he developed intermittent haematuria which lasted for 21 years—until death.

In 1924—four years before death—the author examined the urine and found in it neither amoebae, nor Koch's bacillus, nor parasites other than a few streptococci—and again with like result during a haematuria relapse in 1925.

In 1926, during haematuria attack, the urine as on the previous occasions, was passed in the author's laboratory and examined directly and after immediate centrifuging. No amoebae were found, but the urine revealed large rounded cells, containing a protoplasmic mass, without inclusions, turning slowly on themselves without appreciable locomotion, showing also a thin hyaline rim. Staining with iron-haematoxylin revealed neither free nor encysted amoebae. The cells were large mononuclears such as he had found on other occasions in urine, stools and sputa ; and which had been taken by others to be amoebic cysts.

In September, 1927, during the author's absence, the patient had haematuria. The urine was examined by a colleague who reported finding in it amoebae of *histolytica* type. Amoebic cystitis was diagnosed and emetine therapy instituted—with no effect on the haematuria.

In November, 1927, the author again examined the bloody urine and in one slide preparation of fresh urine found a form resembling an amoeba. Other preparations of same material stained with iron-haematoxylin revealed no amoebae but only large mononuclear phagocytes. During the 6 months following and up to the patient's death (no autopsy) the author examined the urine on very many occasions ; on none was an amoeba found. Repeated stool examinations also failed to show amoebae. The clinicians, however, remained unshaken in their diagnosis of " une amibose vésico-rénale." The author describes the " amoeba " found on the one occasion and gives reasons for diagnosing it as *Trichomonas* ; an opinion in which BRUMPT and DESCHIENS concurred—the latter pointing out once more the necessity of " parasitological proof " of amoebae, i.e, wet fixation and differential staining with iron-haematoxylin, and inoculation into kitten.

Dr. Khouri ends his paper by stating that in too many of the cases reported in Egypt as amoebic, " l'amibe vraie " has been the one thing always lacking [as has been more than suspected by any informed reader of the said reports].

H. M. H.

VAN CUTSEM (A.). Un cas d'amibiase urinaire. [**Case of Urinary Amoebiasis.**]—*Bull. Méd. du Katanga.* 1928. Vol. 5. No. 1 & 2. pp. 16–19.

A child, 4½ years old, suffered from haematuria. Microscopic examination of stools was negative, that of urine revealed besides red blood corpuscles, epithelial cells, crystals, granular and epithelial casts, a multitude of granular bodies about 30 microns in appearance exactly like "Amoeba Loeschia Histolytica" in the precystic stage: a very few of these contained blood corpuscles. All were non-motile, in spite of warming the specimen. Improvement and finally apparent cure followed on emetine injections. The author cites PETZETAKIS's like observations in Egypt in support of his diagnosis of this case as one of amoebic nephritis. [It is no support. The only permissible support is the demonstration in properly stained specimens of the characters of *E. histolytica.*]

H. M. H.

TOULLEC (F.) & BLANCHARD (M.). Guérison de la dysenterie amibienne chronique par la méthode de Montel. [**Cure of Chronic Amoebic Dysentery by Montel's Method.**]—*Bull. Soc. Path. Exot.* 1929. Mar. 13. Vol. 22. No. 3. pp. 156–158.

The patient (a Legionary) had contracted dysentery 6 years previously in Syria. His history sheet recorded frequent relapses, frequent emetine courses; and that on occasion vegetative and encysted amoebae had been found in his stools. For 6 years he had, in between acute attacks of dysentery, passed three or four semi-fluid stools a day. When seen by the authors the patient had an acute dysentery attack, and the stools revealed numerous cysts of *E. histolytica.* Emetine and stovarsol were followed by clinical improvement, but three to four semi-fluid stools a day were still passed. The authors then tried the anti-dysenteric serum prepared by MONTEL (Saigon). On two consecutive days 50 cc. by mouth, and 50 cc. per rectum. From then onwards the patient passed only one formed stool a day, in which repeated examinations revealed no cysts. He gained 6 kgm. in weight. The authors reject "bacillary" for the nature of the dysentery, and insist on "amoebic." [But on no grounds disclosed in the paper that will stand criticism.]

H. M. H.

MONTES PAREJA (Justo). Enteritis amibiana y muerte súbita, probablemente por fibrilación ventricular. Intoxicación emetínica. [**Amoebiasis and Sudden Death. Emetine Poisoning.**]—*Semana Méd.* 1929. June 27. Vol. 36. No. 26 (1850). pp. 1697–1700. [19 refs.]

The patient, a woman 26 years of age, complained of acute pain in the right hypochondrium and shoulder; she had had a previous attack of diarrhoea with mucus and blood in the stools. Cysts of *E. histolytica* were numerous in the faeces and emetine was given. A week later pus was removed from the liver by aspiration. Three weeks afterwards irregularity of the pulse was noticed and a day or two later, she suddenly became rigid, with dilated pupils, was pallid, then cyanosed and bathed in perspiration, and died. The author discusses the question of causation. He mentions the various forms of arrhythmia which have been associated with acute amoebic dysentery—sinus arrhythmia, ventricular extrasystoles, tachycardia and bradycardia; but in this patient he ascribes the condition to emetine intoxication and the cumulative action of the drug. During the first two weeks 0·87 cgm. was given, two doses daily, but never exceeding 0·08 cgm. This was well tolerated, producing no nausea, debility or

any cardiac disturbance. After an interval of six days a daily dose of 0·04 cgm. was given, but on the fifth day arrhythmia appeared and the drug was stopped; the total quantity amounted to 1·07 gm. in 26 days.

H. Harold Scott.

STERN (E.). Anaphylaktischer Chok und Tod nach 0,02g intraglutäaler Emetineinspritzung bei einem Kinde. [**Anaphylactic Shock and Death of a Child after Emetine Injection.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Dec. Vol. 32. No. 12. pp. 610–612.

The case occurred in Tiberias, Palestine. The author was called to a previously healthy child 2 years old, who, on the third day from onset of "amoebic" dysentery had received, for the first time, an injection into the gluteal region of 0·02 gm. emetine. This was immediately followed by severe vomiting; rapid onset of collapse; patient pulseless; icy cold; Cheyne-Stokes' breathing; cessation of heart beats. Camphor, adrenalin, caffein, lobelin, were without slightest effect. The patient died. The author goes on to stress, in contrast, the safety and efficacy of yatren, citing in support his own clinical experience with that drug.

[In this paper no evidence whatever is so much as suggested why the fatal shock should be labelled anaphylactic; nor even moderately satisfactory evidence that the dysentery was in fact amoebic. That emetine (demonstrated toxic to heart muscle cells !) might be more than usually dangerous in bacillary dysentery (toxic !) is an expectation not new and yet well founded.]

H. M. H.

SANDERS (Elizabeth P.). **Changes in the Blood Cells of Kittens resulting from Infections with** *Endamoeba histolytica.*—*Amer. Jl. Hyg.* 1928. Nov. Vol. 8. No. 6. pp. 963–989. With 5 graphs. [43 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore, Md.]

In a survey of the literature concerning the effect of *E. histolytica* on the blood cells of infected hosts, it was found that a polymorphonuclear leucocytosis was often associated with amoebiasis in man, and that a large mononuclear increase had been reported; the leucocytosis was usually more severe in cases of amoebic abscess of liver. There were no records of blood counts in kittens, though these were used for experimental work with *E. histolytica.* Bacteraemias or septicaemias often found in kittens dying of amoebiasis were suggested as cause of death, and believed to be present in man more often than reported. With these results in mind, the author undertook two groups of experiments.

(1) Ten kittens with amoebiasis and five uninfected as controls. Eight of the ten showed clearly polymorphonuclear leucocytosis coupled with a rise in the large mononuclear cells. Two were resistant to inoculation with *E. histolytica,* and when they finally developed it, had atypical histories. The prepatent period of *E. histolytica* in amoebic kittens was 3–7 days; infection 5 days to 3 weeks (one recovered after an infection of two months). Necropsy of all the amoebic animals revealed ulcerated haemorrhagic colons; three had liver abscesses.

(2) Ten amoebic and ten uninfected control kittens. The amoebic developed polymorphonuclear leucocytosis with large mononuclear increase. Blood cultures from heart of ten normal kittens were negative: and cultures from four kittens before inoculation were negative. Nine cultures made from five kittens during infection were negative. Cultures from six

amoebic kittens just before death showed bacteraemia. Leucocytoses were always present, bacteraemias were terminal : the former were therefore independent of blood stream infections, or of liver abscess formation.

The author's experiments also revealed that a strain of *E. histolytica* may lose virulence in culture. A normal blood count for kittens 6 weeks to 2 months old was determined, viz. :—

Red blood cells	5 to 6½ million.
White blood cells	8–12,000.
Polymorphonuclears	45–71 per cent.
Lymphocytes	22–46 per cent.
Large mononuclears	2– 5 per cent.
Eosinophiles	1– 5 per cent.

It was also found that normally acquired intestinal parasites, e.g., coccidia, trichomonads, and worms, caused minor changes in the numbers of the different kinds of white blood cells.

H. M. H.

REGENDANZ (P.). Ueber die Uebertragung der *Entamoeba histolytica, Entamoeba coli* und *Dientamoeba fragilis* auf Ratten. [**Transmission of** *E. histolytica, E. coli* **and** *D. fragilis* **to Rats.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Apr. 25. Vol. 111. No. 6/8. pp. 412–419. [18 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author reviews observations of various workers on amoebae of rats and mice, by LYNCH (1925), BRUG, KESSEL, CHIANG. He describes his investigation of natural amoebic infections (very rare) in his laboratory bred rats, and his precautions (careful repeated examinations of faeces after dosing rats with salts) to exclude infection of rats before experiment. Full accounts are given of his numerous experiments, and of his daily observations on the rats after the experiment ; generally infection was not easily imposed.

i. He succeeded in infecting rats with *E. histolytica* (1) by rectal injection of cultures of the parasite ; (2) by rectal injection of human faeces containing tissue (histolytica) forms, and minuta forms, of *E. histolytica* ; (3) by rectal injection of faeces of cat containing tissue forms of *E. histolytica.* He failed to infect rats by feeding through catheter-passed-into-stomach with human faeces containing tissue forms and cysts of *E. histolytica.*

No rat infected with *E. histolytica* showed outward signs of dysentery. One autopsy revealed some signs of dysentery in caecum, macroscopically and in sections, but no amoebae could be seen in mucosa or submucosa. The slightness of the *E. histolytica* infection, and its apparent nonpathogenicity in his rats makes the author doubt if LYNCH and CHIANG are right in holding the rat to be a natural carrier and spreader of *E. histolytica* infection to man. His own attempts to set up dysentery in *E. histolytica* infected rats by damaging the colon mucosa by injecting water at 60 C. or by giving toxic doses of mercury, produced only temporary passage of mucus per rectum.

In the rats' gut the minuta forms showed ingested bacteria, as with *E. histolytica* in culture. Also, as in culture, so in the rats' gut there was rapid change in the tissue forms. Though he has indisputably infected the rat with the tissue forms yet minuta forms subsequently appeared.

ii. He was successful in infecting rats with *E. coli*—by rectal injection—of human faeces, and of rats' faeces, containing active forms and cysts of *E. coli*. He failed to infect rats by feeding them through catheter-passed-into-stomach with human faeces containing active forms and cysts of *E. coli*.

iii. *Dientamoeba fragilis*—hitherto found only in man; he has infected the rat by rectal injection of human faeces containing this amoeba.

H. M. H.

TRIPOLI (Carlo J.). **Preparation of Culture Media for Routine Cultures of Feces for Pathogenic Amoebas.**—*Proc. Soc. Experim. Biol. & Med.* 1928. Dec. Vol. 26. No. 3. pp. 245–247. [6 refs.] [Lab. of Clin. Med., Tulane Univ., Louisiana.]

The author claims that as an aid to microscopic examination of faeces for the diagnosis of pathogenic amoebae, routine cultures should occupy a prominent place in the clinical laboratory. Dobell's modifications (1926) of Boeck and Drbohlav's original media (1925) is best suited for routine use. It furnishes a definite source of assimilable carbohydrate as food for the amoebae and further provides a mild antiseptic (acriflavine) to inhibit growth of the bacteria which would prevent a culture of the amoebae.

In obtaining and maintaining a large number of cultures of *E. histolytica*, the author has studied many details of producing a uniformly successful medium. He here gives in full detail results of these studies; they cannot be summarized—for their value lies in their full detail and in attention to that detail.

It was found that initial growth occurred usually in both plain and acriflavine charged media: but sometimes only one variety of medium gave a positive culture. In a large series all proven cases gave cultures of the pathogenic amoeba. Non-pathogenic strains occasionally grew, but did not withstand successive transplanting in the two media described. Fresh cultures should be "carefully nursed" and transplanted every 36–48 hours. Older cultures may be transplanted every 3 to 6 days.

H. M. H.

YOSHITAKE (Seigo). **Preliminary Report on the Cultivation of** *Entamoeba histolytica*.]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1929. Jan. No. 286. [In Japanese. English summary p. 4.] [Govt. Hosp., Taihoku.]

The author records successful cultivation of amoebae from mucosanguineous stools of dysentery patients, on H. Vogel's modification of Boeck & Drbohlav's medium. The amoebae multiplied and were living for 15 to 117 days. To keep them vigorous it was necessary to alternate blood agar medium with the starch-agar medium. The amoebae grown on artificial media diminish a little in size as compared with the nutritive form found in human faeces. To obtain pure cultures, the same medium was inoculated with pus from two cases of amoebic liver abscess, where *E. histolytica* had been found alone, to exclusion of other micro-organisms. The amoebae lived in the one case for 27 hours; and the other for 48 hours, but showed no multiplication. The cultivated amoebae inoculated into rectum of 5 kittens failed to infect the animals; presumably because the inoculum was too old, having passed through many generations on artificial media.

H. M. H.

SAUTET (Jacques). Pouvoir pathogène des cultures d'*Entamoeba dysenteriae* faites en présence d'amidon de riz. [**Pathogenic Power of Cultures of** *E. histolytica* **made with Rice Starch.**]—*Ann. Parasit. Humaine et Comparée.* 1929. Mar. 1. Vol. 7. No. 2. pp. 140–144. [2 refs.]

Many workers have shown that pathogenicity of *Entamoeba histolytica* is apparently always maintained in cultures made according to the method of Boeck & Drbohlav. This is not the case however when the culture medium is modified by addition of rice starch. For example, DOBELL & LAIDLAW (1926) [this *Bulletin*, Vol. 24, p. 363], concerning this rice starch medium wrote :—" Although we inoculated 7 kittens intrarectally with cultures containing enormous numbers of active and apparently normal amoebae we did not succeed in infecting a single kitten." The author on the contrary found (1926) that in rice starch medium the amoebae after the 26th, 78th, and 100th subculture killed kittens with production of typical lesions of amoebic dysentery which contained haematophagous amoebae. He notes that the kittens were inoculated not only with amoebae but also with a large number of bacteria which possibly play an important pathogenic role.

He here records observations on three strains of *E. histolytica* from three dysenteric patients. Rice starch cultures of two of these strains (one of which was apparently of low virulence for man) proved fatal to kittens. Rice starch culture of the third strain (virulent in man) failed even to infect kittens, although direct inoculation of amoebic stools from the respective human patient into the kitten produced a fatal dysentery in the latter.

H. M. H.

COUTELEN (F.). Recherche du fer chez l'amibe dysentérique hématophage. [**Test of the Haematophagous Dysenteric Amoeba for Iron.**]—*Bull. Soc. Path. Exot.* 1928. May 9. Vol. 21. No. 5. pp. 369–371. [1 ref.] [Parasit. Lab., Faculty of Med., Paris.]

Employing a potassium ferrocyanide and dilute HCl technique, the author could demonstrate the presence of iron in epithelium of gut and in phagocytic endothelial cells containing red blood corpuscles in various stages of digestion—but in numerous amoebae from human amoebic dysentery cases and from the kitten experimentally infected with amoebic dysentery, which contained red blood cells in various stages of digestion, the same technique failed to demonstrate any trace of iron. The author gives as possible explanations :—

(1) Haemoglobin in the red blood cells is broken up extremely slowly, and the iron is liberated in too small quantities to be shown up by the microchemical technique employed, excretion in the dysentery amoeba being much more rapid than the slow digestion of the phagocyted red blood cells, or

(2) The amoeba utilizes only the stroma of the red blood cell, excreting the haemoglobin as such unaltered.

H. M. H.

BACILLARY DYSENTERY.

SARTORIUS (Fr.). Zur Ruhrdiagnostik. [**Dysentery Diagnosis.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Mar. 8. Vol. 111. No. 4/5. pp. 266–286. [16 refs.] [Hyg. Inst., Univ., Münster i.W.]

Discussion still continues regarding the proper classification of strains of dysentery bacilli. A number of strains, other than the easily

separated Shiga-Kruse dysentery bacilli, were subjected to test by the author, with the following results :—

1. Only the so-called E strain of Kruse has yet been satisfactorily separated from other groups. Its characters are: fermentation of mannite, maltose and saccharose, absence of gas formation in glucose agar, no formation of indol and coagulation of milk in about 10 days. To these must be added a high degree of resistance to dye stuffs, especially trypaflavin, capability of utilizing ammonium lactate and succinate as sources of nitrogen and practical absence of coagglutination by sera of other dysentery types.

2. The exceptional position of the J strain (Schmitz bacillus), giving no coagglutination with sera of other dysentery strains and giving a positive indol reaction, requires further investigation in regard especially to its mannite, maltose and glucose fermentation.

3. The definitive characters of the remaining dysentery strains are, mannite fermentation without gas and absence of formation of gas in glucose. They are mostly indol-positive. Behaviour in litmus milk, presence or absence of catalase properties, and special resistance to dye stuffs are of little value for separation of strains into groups. None of the mannite fermenting dysentery organisms can utilize ammon. benzoate and ammon. citrate as sources of nitrogen; a number can utilize ammon. lactate, while few, except the E strains, can utilize ammon. succinate. Agglutination and absorption tests serve to differentiate sharply five groups in the case of 90 per cent. of the test strains—group I (Kruse A) 36·6 per cent., II (probably Kruse B and C) 17·3, III (Kruse H) 17·3, IV (probably Kruse D) 11·5 and V 5·8 per cent.

W. F. Harvey.

Murakami (K.). Darstellung spezifischer Seren gegen Dysenteriebazillen und ihre agglutinatorische Einteilung. [**Procural of Specific Dysentery Sera and their Use in Classification.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 61. No. 5/6. pp. 486–498. [Bact. Inst., Univ., Sendai.]

By a "specific" serum is meant here one which will only agglutinate organisms of one serological group and no others. Tests were first applied with sera corresponding to strains of 10 groups, originally isolated by Aoki and 6 were, by agglutination and absorption tests, found to be "specific" sera. Agglutination tests were carried out with these 6 sera upon 260 strains of dysentery bacilli. Groups of organisms were found the members of which agglutinated strictly with only one of the 6 test sera. Two groups were found of organisms agglutinating with two of the sera only and one agglutinating with none of the sera. Fresh sera were then prepared from a certain number of the non-agglutinating organisms and these were used to differentiate this group. Organisms selected from the new groups obtained, together with organisms selected from the originally "specifically" agglutinating organisms were tested against their corresponding antisera, with the result that now 10 "specific" sera were obtained. These served for retest of the 260 strains. By a repetition of the process already described fresh sera were obtained in the case of strains which did not specifically agglutinate and the whole of the series of organisms was finally differentiated into 11 groups. Corresponding sera were obtained

which were strictly specific in the sense that they reacted only, by cross agglutination and absorption tests with their homologous organisms and showed no co-agglutination at all. Certain strains were found to react quite specifically with a single serum, but not quite to titre.

W. F. Harvey.

CRUZ (J. da Costa). Action de la chaleur sur les agglutinines du sérum anti-bacille de Flexner. [**Action of Heat on the Agglutinins of Flexner Serum.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 948–951. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

If a powerful agglutinating serum is set up in serial dilution with a sufficiently thin suspension of the homologous organism, agglutination appears first in one of the tubes of the series and later, more or less symmetrically, in the tubes on either side of the first. The term optimum is applied to the first appearing agglutination. The experiments here carried out with a Flexner serum, unheated and heated for 5, 10, 15 and 20 minutes at 55° C. showed the following optima respectively, 1 in 320 after 30 min. at 37° C. and 15 min. at room temperature (26° C.), 1 in 640 to 1,280 after 30 min. at 37° C. and 20 min. at room temperature, 1 in 1,280 after 30 min. at 37° C. and 45 min. at room temperature, 1 in 1,280 after 30 min. at 37° C. and 1 hr. 15 min. at room temperature, between 1 in 2,560 and 5,120 after 30 min. at 37° C. and 1 hr. and 45 min. at room temperature. The appearance of agglutination in the first tube (optimum) is delayed by the heating at 55° C. but is raised in titre. The end titre in all the cases was 1 in 20,000. This and further experiments lead to the conclusion that the heated agglutinins have less affinity for antigen than those of fresh serum, or, expressed otherwise, that the antigen is capable of absorbing a greater amount of fresh serum antibody than of heated serum antibody. The explanation of the displacement of the optima of agglutination with heating of the serum is probably to be found in this fact. Absence of agglutination, similarly, in the so-called agglutinoid zone may be attributable rather to excess of free antibodies in the mixtures than to those combined with the antigen.

W. F. Harvey.

CRUZ (J. da Costa). Action de la chaleur sur l'agglutinogène du bacille de Flexner et optimum d'agglutination. [**Action of Heat on the Agglutinogen of Flexner's Bacillus and on Optimum Agglutination.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 958–959. [Oswaldo Cruz Inst., Rio de Janeiro.]

The test suspensions were subjected to temperatures of 100, 120, 134 and 200° C. for 30 minutes and were then set up in mixtures with different dilutions of anti-Flexner serum. With an unheated suspension of bacteria the optimum agglutination was found with dilutions of serum between 1 in 640 and 1 in 1,280 and the agglutination titre after 24 hours at 1 in 40,000. For suspensions heated at 100, 120 and 130° C. the optimum agglutinations were 1 in 160, between 1 in 64 and 1 in 128, and 1 in 80 respectively, while the 24-hour titres were

all 1 in 10,000. Suspensions heated at 200° C. gave a brown liquid and an agglutinated bacterial deposit which was microscopically amorphous. The supernatent liquid of this suspension was quite unable to fix any agglutinin.

W. F. Harvey.

WICHMANN (F. W.). Ueber die Bildung des Dysenteriegiftes in synthetischen Nährböden. [**Production of Dysentery Toxin in Synthetic Media.**]—*Arb.' a. d. Staatsinst. f. Exp. Ther. u. d. Georg Speyer-Hause zu Frankfurt a.M.* 1928 No. 21. pp. 362–371. With 2 text figs. [11 refs.] [State Inst. for Exper. Therap. & Municipal Hyg. Inst., Univ., Frankfurt a.M.]

The synthetic medium used had the composition : ammon. chloride. 0·5 ; sod. sulphate, 0·5 ; mag. sulphate, 0·01 ; di-hydrogen pot. phosphate, 0·05 ; di-pot. phosphate, 0·15 ; sod. lactate, 0·5 ; twice distilled water to 100, with pH 6·8 to 7·2. The culture in this medium was killed with toluol, centrifuged, and the centrifugate and sediment separately tested by intravenous injection in rabbits. The centrifugate was toxic and the sediment was not. But it is not justifiable to conclude from this that the bacteria are not themselves toxic, for with long incubation some are dying and their toxin would then be found in the medium. Death and dissolution of the bacteria are promoted by the addition of the toluol. This point is elucidated by the following experiment. Incubation of the cultures was for 3 days and 6 days. The 3-day and 6-day cultures were first separated into centrifugate and sediment and the toluol then added. When this procedure was followed both the centrifugate and the sediment were found to be toxic. But if the toluol was added to the 6-day culture before centrifuging, the centrifugate showed itself toxic while the sediment was not. The conclusion is reached that Shiga-Kruse bacilli produce intracellular toxin in a lactic acid-ammonium medium and that this toxin only appears in the medium with the death of the bacilli.

W. F. Harvey.

BLAKE (Adelaide V.) & OKELL (C. C.). **Seasonal Variation in the Susceptibility of Mice to Dysentery (Shiga) Toxin.**—*Brit. Jl. Experim. Path.* 1929. Apr. Vol. 10. No. 2. pp. 175–179. With 1 chart in text. [8 refs.] [Wellcome Physiol. Research Labs., Beckenham, Kent.]

Variability does not affect the titration of diphtheria antitoxin to any serious extent because the test dose of toxin contains so many lethal doses. It is different with titrations of dysentery (Shiga) toxin and antitoxin. In this case a test dose of toxin, as defined by the League of Nations, is the amount of toxin which, when mixed with one unit of Copenhagen standard serum (0·005 cc.) and injected intravenously into a group of mice will kill 33 per cent. and with 2/3 unit of standard serum will kill 66 per cent. Variations in mortality have been followed out by the authors for groups of 20 mice injected with a constant toxin-serum mixture at frequent intervals between November of one year and December of the following year. The test toxin used (3A) consisted of the dried intact bodies of the Shiga

bacillus. A variability was found and is shown by means of a chart of average monthly percentage mortalities. Susceptibility appeared to be greatest during the first quarter of the year and to show a marked fall between June and October. A variation of this order can easily lead to titrational error. If, however, the test dose of toxin be increased, as already suggested by the authors, the errors due to variations in susceptibility of mouse groups should be reduced to insignificant proportions.

W. F. Harvey.

MADSEN (Th.) & JENSEN (K. A.). **Standardization of Dysentery Serum.** —*Acta Med. Scandinavica.* 1929. Vol. 70. No. 5/6. pp. 430–435. [State Serum Inst., Copenhagen.]

Some of the questions which have arisen at the various conferences on the subject of standardization of dysentery serum are set out. Was the anti-infectious or the antitoxic effect of the serum to be the basis of measurement ? Was the toxin to be regarded as made up of different components such as endotoxin (enterotoxic) and exotoxin (neurotoxic) and were there specific antibodies to such component antigens ? Were mice or rabbits the best animals to use and ought the injections to be subcutaneous, intraperitoneal or intravenous ? A very considerable degree of agreement has been reached on controversial points. As uniform results had been attained with dried bouillon toxin, killed bacteria, " Vollgift," autolyzed bacteria, etc., it was decided to use only dried bacteria prepared in a definite way. Mice of 16 to 18 gm. were to be used and were to be injected intravenously with a mixture of toxin and serum (0·5 cc.), after standing one hour at 37° C. Lastly, just as in the case of diphtheria, a dried serum was to be the standard of measurement and not the toxin. Some divergent results have been found to depend on fluctuations in the resistance of the mice used and on the season at which experiments were performed. For these reasons it is evident that the mice used should at least be of the same age and of the same breed. The standard serum is a Shiga-Kruse serum. At the State Serum Institute in Copenhagen a large quantity of dried standard serum is now kept *in vacuo*, with a strength of 20,000 units per gramme. The unit is an arbitrary one and so fixed that 10 cc. of an average serum contain about 5,000 units. A standard solution containing 200 units per cc. is sent out four times a year to accredited institutes throughout the world and with this they adjust the test toxin used in measuring the strength of commercial sera.

W. F. Harvey.

MENTON (J.). **Agglutinins to *B. dysenteriae* in the apparently Healthy.** —*Brit. Med. Jl.* 1929. June 22. pp. 1115–1117. [3 refs.]

The technique of DREYER was used and each serum was tested against Shiga's bacillus, Flexner's bacillus of types V, W, X, Y and Z, Sonne's bacillus and, as controls, against *Br. abortus* (Bang). A total of 524 serums was examined, half male and half female, with the result that positive findings were obtained in 16 males and 17 females. Only one of the individuals tested gave a history of dysentery, 30 years previously. Although the males reacted most frequently to Sonne's bacillus (8 individuals), the highest titres were to types V, W and Z

of the Flexner group. The females reacted most frequently (15 individuals) to type V Flexner. In the Medical Research Council Special Report No. 51 it is stated that 10 standard agglutinin units per cc. in a man and 20 in a woman are practically diagnostic of active infection by the bacillus agglutinated and that 6 to 8 units in a man and 12 to 16 in a woman indicate a high probability of dysenteric infection, provided always the individual has not had the disease and has not been inoculated. The standard laid down, although very helpful, is not absolute, for active dysentery cases may not show the required titre, and apparently normal individuals may show a higher titre. But the evidence now available suggests that these so-called normal agglutinins are a residual index of previous mild attacks of dysentery, which may have been ignored and have remained undiagnosed.

W. F. Harvey.

GRASSMÜCK (Elise). Vergleichende Untersuchungen über die Wirkung durch Hitze und Yatren abgetöteter Ruhrvakzins. [**Sterilization of Dysentery Vaccine by Heat and by Yatren.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. May 28. Vol. 112. No. 3/4. pp. 232–243. With 5 graphs in text. [16 refs.] [Children's Clinic, Univ., Leipzig.]

Yatren, which is an iod-oxychinolin-sulpho-acid, in 0·25 to 2 per cent. solution, is compared with a water-bath temperature of 37° C. for one hour in respect of sterilizing action and influence upon antigenic potency of dysentery vaccine. The results show that no difference can be found between them except that yatren has the advantages of easier application and of continued preservative action. The agglutinin content of the immune sera is the same whatever the mode and duration of sterilization, and so are the general and local reactions produced.

W. F. Harvey.

LURJE (M.), ROSENBLATT (A.) & KOSSAREW (N.). Die Dysenterie-Anavakzine Shiga-Kruse und ihre vakzinierenden Eigenschaften. [**Properties of Shiga-Kruse Dysentery Anavaccine.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 61. No. 1/2. pp. 130–136. [7 refs.] [State Inst. for Microbiol. & Hyg., Baku (Azerbaijan).]

The difficulties of prophylactic vaccination with Shiga-Kruse organisms, owing to the toxic reaction they set up, are well known. An anatoxic vaccine seems to afford a solution of this difficulty. The authors used a strain which, after sterilization at 60° C., killed rabbits of 1,700 to 2,000 gm. with doses of 250 million in 5 days, while 1,000 million killed in 16 hours. Vaccine suspensions were made up to the strength of 2,000 million organisms per cc. It was found that such a vaccine after treatment with a concentration of 0·5 per cent. formalin at 39° C. for 21 days did not affect rabbits on intravenous injection of 8,000 million organisms. The antigenic properties of this vaccine were satisfactory both as regards the production of high agglutinin titre (1 in 3,000 to 4,000 macroscopic) in rabbits' sera and protection against the lethal toxic dose of 1,000 million organisms. Rabbits

showed reaction to large doses of the vaccine by a rise of temperature of 1 to 2° C. which was of short duration and by loss of weight which might reach 10 per cent. Eleven men were tested with serial doses of 1, 2 and 3,000 million organisms administered subcutaneously at intervals of 5 days and showed only a slight local reaction.

W. F. Harvey.

DENYS (P.). Mutation d'un bacille dysentérique de Hiss sous l'influence de passages successifs dans du sérum anti-correspondant. [**Mutation of a Hiss Dysentery Bacillus with Culture in Homologous Antiserum.**]—*C.R. Soc. Biol.* 1929. June 14. Vol. 101. No. 20. pp. 507–508. [2 refs.] [Path. Inst., Louvain.]

The bacillus used gave smooth colonies on agar and uniform turbidity in broth: it was a typical S form. The first culture in bouillon, containing 10 per cent. antiserum, showed a growth agglutinated at the bottom of the tube and a clear supernatant medium. The second passage produced a few granular masses floating in the bouillon and these increased with subsequent passages. By the 28th passage transformation to the R form was complete; the bouillon culture was granular; the colonies on agar were rough and the bacilli were not agglutinated by anti-S serum. Colonies on agar from the 18th passage were mostly of S type, but showed a few (4 per cent.) colonies of quite different appearance. The latter were small, iridescent, of very irregular outline, transparent and fluid, and showed exceedingly polymorphic bacterial elements. With the 19th passage there were 35 per cent. of these colonies, 40 per cent. with the 20th, 20 per cent. with the 21st, 3 per cent. with the 22nd, and none thereafter. These colonies, when further subcultured on agar, gave a mixture of similar colonies and colonies of S and R types. This colony then represents an unstable form intermediate between S and R forms.

W. F. Harvey.

DENYS (P.). Mutation d'un bacille dysentérique de Hiss sous l'influence d'un principe lytique. [**Mutation of a Hiss Dysentery Bacillus with Subjection to a Lytic Principle.**]—*C.R. Soc. Biol.* 1929. June 14. Vol. 101. No. 20. pp. 509–510. [3 refs.] [Path. Inst., Louvain.]

The lytic principle used, which had been isolated from the faeces of the cow, was weak and could not be exalted in virulence. Five cc. of bouillon of pH7·8, made slightly turbid with some drops of young culture of pure S type, had added to it 5 drops of lytic principle and the mixture was placed in the incubator at 32° C. Subcultures on agar were made at intervals. The bouillon mixture began to clear after 1½ hours, was perfectly clear in 3 hours and showed the development of secondary culture between the 5th and 8th hour. Subcultures made after 30 minutes in the incubator showed upwards of 100 colonies, many of which were notched and eroded: after 1 hour one colony of type S, after 2 hours no colonies, after 3 hours 6 colonies, after 5 hours 3 colonies, 2 of which were of intermediate type, after 13 hours hundreds of colonies, but none of intermediate type were obtained. With 30

hours incubation most of the colonies had a glassy appearance and gave rise to daughter colonies of golden yellow colour and smooth form. The daughter colonies when subcultured gave a pure growth of the intermediate type. This type, intermediate between S and R forms, obtained by the action of a weak lytic principle, was in every respect identical with that obtained by growth in antiserum (this *Bulletin*).

W. F. Harvey.

LARGE (D. T. M.). **Dysentery in the Lahore Military District.**—*Indian Jl. Med. Res.* 1929. Apr. Vol. 16. No. 4. pp. 1128–1138. With 2 charts in text. [9 refs.]

A detailed account of an interesting and valuable investigation whose results show that :—

(1) Bacillary dysentery in Lahore military district is very much commoner than amoebic, forming some 80 per cent. of the total dysentery.

(2) While present throughout the year, its incidence increases markedly in warm months before the real hot weather and immediately following it.

(3) It has been usually very mild in type in 1925 to 1927, even in Shiga infections. Some Flexner infections had only one day's diarrhoea with blood and mucus in stool.

(4) In Lahore, bacillary dysentery occurs as—Flexner infections 74·1 per cent. ; Sonne 13·3 per cent. ; and Shiga or Schmitz 12·6 per cent.

(5) Agglutination tests in the case of dysentery require incubation for 16 hours at 56° C. It was found convenient to leave them overnight in the water bath.

(6) Diagnosis of Sonne dysentery requires a high titre serum made from a circular smooth colony of this organism, or preferably two sera, one from the said colony and another from the crenated late colony.

(7) An originally large group of inagglutinable Flexner organisms was found on retention for a year in laboratory to have become agglutinable to a small extent with Flexner sera and then to be capable of producing a serum which agglutinated various bacilli of the Flexner group in some cases in high titre.

H. M. H.

BERND (Mario). Notulas sobre dysenteria bacillar no Rio Grande do Sul. Contribuição ao symposio anhydro sobre dysenterias, effectuado em uma das sessões de Sociedade de Medicina de Porto Alegre. [**Jottings on Bacillary Dysentery in Rio Grande do Sul.**]—*Sciencia Med.* 1929. May. Vol. 7. No. 5. pp. 250–254. [6 refs.]

The author discusses, with running comments, the subject of bacillary dysentery, its epidemic incidence in certain towns of the Brazilian state of Rio Grande do Sul, the question of carriers of dysentery bacilli who show no symptoms of the disease, its seasonal prevalence, and the probabilities of its being a water-borne disease. He touches upon the use of autogenous bacteriophage and autogenous vaccine in treatment and upon the agglutination titres which are diagnostic for Shiga bacilli on the one hand and Hiss and Flexner bacilli on the other.

W. F. Harvey.

ELKELES (Gerhard). Zur Klinik und Bakteriologie der E-Ruhr. [**Clinical and Bacteriological Characters of E-dysentery.**]—*Deut. Med. Woch.* 1929. Mar. 8. Vol. 55. No. 10. pp. 393–394. [4 refs.]

This critical discussion has been prompted by the occurrence of epidemics of dysentery in which the E bacillus of Kruse figured prominently as the cause. Out of 178 cases of positive diagnosis of dysentery there were 141 E dysentery cases, while out of 133 E cases 87 had blood and mucus in the stools, 40 had mucus, 4 were simply diarrhoeic and 2 mothers of sick children had normal stools. On the whole, E dysentery is a mild affection. It can occasionally simulate appendicitis. Bacteriological characters of this bacillus—often called the Sonne bacillus—are set out in some detail. The author strongly advocates the abandonment of the old classification of dysentery organisms into " Y, Flexner and Strong " types which he maintains do not correspond to real units. A much better method of classification is that according to the letters of the alphabet as adopted by KRUSE, which gives types extending from A to J. Finally all these organisms from the Shiga-Kruse to the J type should be called true dysentery bacilli and the term " pseudodysentery " abolished altogether.

W. F. Harvey.

NORMET (L.), URBAIN (Ach.) & CHAILLOT (L.). Sur un bacille du groupe des *Salmonella* provoquant chez l'homme des dysenteries et des diarrhées cholériformes. [**A Salmonella Organism causing Dysentery and Choleraic Diarrhoea in Man.**]—*C.R. Soc. Biol.* 1929. July 5. Vol. 101. No. 23. pp. 752–753.

This bacillus, isolated during an epidemic of dysentery in Annam, is considered by the authors to be the cause of the condition. It has the morphological and cultural characters of a Salmonella organism, possesses a variable virulence and secretes a toxin which may kill a 2-kgm. rabbit in a few hours upon intravenous injection of 0·1 cc. of filtrate of a 48-hr. culture. It is not agglutinated by typhoid, paratyphoid, dysentery, Aertrycke or Gaertner sera and its own specific antiserum is devoid of action on typho-coli and dysentery bacilli.

W. F. Harvey.

CLAYTON (F. H. A.) & WARREN (S. H.). **An Unusual Bacillus recovered from Cases presenting Symptoms of Dysentery.**—*Jl. of Hyg.* 1929. Feb. Vol. 28. No. 4. pp. 355–362. [6 refs.] [Bact. Lab., Univ., Durham & College of Med., Newcastle-upon-Tyne.]

The organism was originally isolated from a healthy girl whose only complaint was of slight abdominal pain and headache for one day, but whose whole family had suffered from diarrhoea 6 weeks previously. It had the character and reactions of *Bact. dysenteriae* (Shiga) but did not agglutinate with antisera prepared from the dysentery and paradysentery bacilli and from *Bact. paratyphosum A*. Other organisms identical with the first isolated were obtained from four separate outbreaks of illness with dysenteric symptoms. These strains fermented glucose and maltose with the production of acid and usually failed to ferment lactose, mannite, dulcite and saccharose in peptone water. A trace of gas was rarely produced from glucose and occasionally slight acid and gas from dulcite. But if Lemco broth were used as the

basis for fermentation of carbohydrates, it was found that the organism produced acid and gas with glucose, dulcite and maltose. The serum of patients, when available, agglutinated the test organism. The authors conclude with the finding that—" On the whole, therefore, the evidence suggests that these organisms may be responsible for the diseased condition."

W. F. Harvey.

FICHERA (Salvatore). Dissenteria da bacillo Ceylonensis. [**Dysentery due to** *Bact. ceylonense.*]—*Policlinico.* Sez. Prat. 1929. Apr. 22. Vol. 36. No. 16. pp. 550–552. [4 refs.] [Med. Clinic, Univ., Catania.]

The author sets out the distinguishing characters of the metadysentery group of bacilli as described by CASTELLANI. He gives clinical details of a case in which the serum reaction was negative for Shiga-Kruse, Flexner, Strong, Hiss-Russell, Gärtner and *coli*, but strongly positive in a dilution of 1 in 900 for Bact. ceylonensis A.

W. F. Harvey.

GILBERT (Ruth) & COLEMAN (M. B.). **Cases of Dysentery in New York State attributed to** *B. dysenteriae* **Sonne.**—*Amer. Jl. Pub. Health.* 1929. Mar. Vol. 19. No. 3. pp. 312–313. [4 refs.] [New York State Dept. of Health, Albany.]

In the space of a few months 12 strains of the Sonne bacillus have been isolated from faeces of persons reported as suffering from more or less severe dysentery. It seems probable that this strain is more prevalent than has hitherto been realized.

W. F. Harvey.

MUGGIA (A.). Un cas de dysenterie par bacille para-dysenterique. [**A Case of Dysentery caused by a Paradysentery Bacillus.**]—*Bol. Sezione Ital., Soc. Internaz. di Microbiologia.* 1929. May. Vol. 1. No. 5. p. 106. [Inst. of Bact. & Immunol., Univ., Turin.]

A woman, æt. 30 years, had suffered for two years from recurrent diarrhoea, sometimes blood-stained ; asthenia ; fever ; flatulence ; tenderness of abdomen—a chronic colitis. No Koch's bacillus found. After repeated platings of stool, a bacterium was grown which had the following characters—non-motile ; gram negative ; milk = O ; lactose = O ; glucose = A ; maltose = O ; saccharose = A ; mannite = A ; inuline = O ; dextrine = O ; laevulose = A ; glactose = A. It therefore belonged to Castellani's paradysentery, var. Hiss-Russell, group. It was agglutinated by the patient's serum in 1 : 200 dilution, and not at all by anti-Shiga and anti-Flexner serums. A vaccine made from it provoked after injection into the patient rigor and high temperature, but was followed by great clinical improvement. Stool examination months later was negative for the germ.

H. M. H.

GREPPI (Luigi). Sulle complicanze della dissenteria bacillare dell' infanzia. [**The Complications of Bacillary Dysentery in Children.**] —*Pediatria.* 1929. June 15. Vol. 37. No. 12. pp. 635–646. [23 refs.]

Eleven cases are detailed in children aged between 7 months and 15 years. Eight of these were Shiga infections ; in three the type is not

stated. Three suffered from a complicating arthritis, one of them with a marked urethritis. Four had definite signs of renal mischief—albumin and casts; three presented considerable oedema although examination of the urine revealed no abnormality. One had a pyelocystitis.

H. Harold Scott.

BACHMANN (Norberto). Yatrenklistiere als rasch heilende Behandlung der Bazillenruhr. [**Enemas of Yatren a Rapid Cure for Bacillary Dysentery.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 327–328.

The author briefly records with emphasis and enthusiasm the startlingly rapid clinical cure of bacillary dysentery in Joinville, Brazil, by clysters of yatren 105. He gave twice daily a rectal injection of yatren 2, to warm water 200 cc., as a rule, but to children and the weaker exhausted adult patients 20 cc. of the same strength. The clyster had to be retained for as long as possible. Number of cases is not given; no failure is recorded.

H. M. H.

WELCH (T. B.). **The Castor Oil Treatment of Acute Bacillary Dysentery.** —*Jl. Port-of-Spain Med. Soc.* 1927. pp. 53–62.

The author recounts his experience in Trinidad and in Kenya Colony with MASCARENHAS [this *Bulletin*, Vol. 22, p. 20]. Treatment is as follows. On day of admission to hospital the patient is given 2 oz. of castor oil, (or 1 oz. if his condition is poor); on second and third days 1 oz. hourly by day. "These courses were then repeated until the patient had had one complete course after that in which he had passed mucus." Little or no restriction of diet.

The author claims for this régime—simplicity; a very greatly reduced death rate; actual duration of symptoms in the first instance not long; relapse unusual and very mild; convalescence prompt; the patients lose little in condition; no patient had developed chronic or asthenic dysentery; abdominal pains absent or slight, defaecation not exhausting and daily number of stools not large. BOASE has tried this treatment in Uganda [*loc. cit.*, Vol. 23, p. 379] and found it equally effective.

H. M. H.

MIXED AND UNCLASSED DYSENTERY.

LOGANADAN (A. D.), assisted by FERNANDEZ (E. C.). **Report on Dysentery in Kohat District.**—*Jl. Roy. Army Med. Corps.* 1929. Apr. Vol. 52. No. 4. pp. 277–279.

The authors note that HEATLY-SPENCER had reported as bacillary over 70 per cent. of the dysentery in Baluchistan Plateau. They comment that in spite of the fact that *Entamoeba histolytica* cysts are quickly killed by desiccation, it has been frequently stated that amoebic is the commonest type of dysentery in dry hot dusty areas.

They now report results of a year's work among British and Indian troops in cantonment (ordered sanitation with pure water supply and no fly-breeding), close to Kohat ("a city submerged in filth, breeding flies in numbers and broadcasting dysentery"). By Manifold's technique—of 137 dysentery cases, 114 showed typical bacillary exudate

alkaline to litmus: from which were isolated B. Flexner 69 cases; B. Shiga 27; B. Morgan 3.

Twenty-three cases showed indefinite exudate of which 1 was acid, 3 neutral and remainder alkaline.

Among 5 cases of amoebic infection *E. histolytica* was twice seen in blood and mucus together with exudate of bacillary type alkaline to litmus, and three times in indefinite exudates alkaline to litmus. All 5 cases gave history of being infected outside Kohat district.

Of 24 cases of diarrhoea examined, 6 gave B. Flexner. Shiga were rather more toxic than Flexner infections. Treatment by salines was instituted promptly on the quickly obtained advance report on the exudate and all cases ran a benign course. All the Shiga strains agglutinated with standard Oxford serum, whereas most of the Flexner strains were inagglutinable by polyvalent Oxford serum. Out of the 69 Flexners eight were late lactose fermenters—Sonne's group. In one case B. Flexner was isolated in the second day of illness; *E. histolytica* and ova of *Schistosoma mansoni* found on the eighth day. The patient had served in Egypt for 3 years, 8 years ago.

H. M. H.

PERRY (H. Marrian) & BENSTED (Harold J.). **Investigations in Egypt of Some Acute Bacillary Intestinal Infections.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Apr. 25. Vol. 22. No. 6. pp. 511–522. With 1 chart. [11 refs.] [Public Health Labs., Cairo.]

This paper is based on the results of the last two years' investigations of bacillary intestinal infections in Egypt. The authors note, however, that no true index of the incidence of these infections can yet be obtained.

Typhoid and Paratyphoid—Mortality is 30 to 40 per cent. amongst *reported* cases. Sporadic distribution points to food contaminated by carriers or flies, rather than to water, as vector. 250,000 inoculations have been carried out. A certain number of severe reactions following inoculation are shown to be due to use of very recently prepared vaccine. They diminished in intensity in direct ratio to length of time that vaccine had been stored.

Laboratory investigation.

1.	Number of Sera Examined	5,449
	Number showing Evidence of Inoculation Agglutinins ...	266
	Number of Uninoculated Cases giving Definitely Positive Reactions	1,346
	Typhoid ... ... 930, or 69·1 per cent.	
	Paratyphoid A ... ... 198, or 14·8 per cent.	
	Paratyphoid B ... ... 218, or 16·1 per cent.	
	Positive Weil-Felix Reactions	174
2.	Faecal Isolations in 50 cases :—	
	Bacillus typhosus ... ... 34, or 68 per cent.	
	B. paratyphosus A ... ... 6, or 12 per cent.	
	B. paratyphosus B ... ... 10, or 20 per cent.	

In 1916, the late Dr. BEATON found among Cairo civil population :—

Typhoid	152, or 79·6 per cent.
Paratyphoid A	13, or 6·8 per cent.
Paratyphoid B	26, or 13·6 per cent.

Paratyphoid B and to less extent A infections sometimes simulated acute dysentery—the stools containing blood and mucus. This is more common in children. Repeated outbreaks of typhoid and para-

typhoid fever amongst convicts in Tantah prison were shown to have as source four carriers in kitchen personnel. Two of these were passing *Bact. typhosum* and two *Bact. paratyphosum B.* Epidemic ended with removal of these carriers.

The Dysenteries.—Warmer months of year, May to November, are accompanied by occurrence of cases of entero-colitis; mild diarrhoea to typical dysenteric attack with tenesmus and blood, pus and mucus in stools. Investigations revealed a very definite correlation between maximum appearance of flies and occurrence of dysentery in both adults and children. In stools, a preliminary cytological examination was always made, even if vegetative forms of *E. histolytica* were demonstrated by microscopical examination, and the stool was then plated on differential medium.

Dysentery in adults.—The majority examined were Europeans, or Egyptians of the upper classes. [The authors note, what Egyptian medical men have recorded, that the "fellah of average intelligence" is little disturbed by an attack of diarrhoea or dysentery: he may seek medical aid for some other complaint and not mention that he is passing almost pure blood and mucus per rectum.]

In adults with clinical dysentery.	*Cases.*
Dys. bacilli of non-mannitol-fermenting group—	
Bact. dysenteriae Shiga	3
Dys. bacilli of mannitol- fermenting group—	
Bact. dysenteriae Flexner	61
Bact. dysenteriae Sonne	12
B. Morgan	6
B. Schmitz	9
Bact. paratyphosum A	1
Bact. paratyphosum B	2
Entamoeba histolytica	16
Mixed infections with both *E. histolytica* and *Bact. dysenteriae* Flexner	3

The *E. histolytica* infections were based invariably on presence of active vegetative forms. It had once been usual to claim most of the dysentery of Egypt as amoebic—in fact, it is seen to account for not more than 12 per cent.

Dysentery in children.—Accounts for a high death rate among them. The official records, 1927, give death rate under 5 years age, from "gastro enteritis" as 100·9 per thousand. The very great majority of these deaths occur in the warmest month, July. The authors' investigation was for the most part (93 per cent.) amongst the poorest children.

Examination of mucoid or liquid stools from 526 young children and infants gave—

	Cases.
Dys. bacilli of non-mannitol-fermenting group—	
Bact. dysenteriae Shiga	47
Dys. bacilli of mannitol-fermenting group—	
Bact. dysenteri Flexneræ	212
Bact. dysenteriae Sonne	28
B. Morgan	56
B. Schmitz	5
B. pyocyaneus	11
Proteus vulgaris	7
Bact. paratyphosum B.	6
E. histolytica	73
Flagellates (Giardia, Trichomonas, Chilomastix)	41
Mixed infections with both *E. histolytica* and *Bact. dysenteriae* Flexner	12

In 7·7 per cent. no accepted pathological agent was demonstrable; the stools were liquid, devoid of blood or mucus, but contained flagellates in enormous numbers—*Trichomonas hominis, Chilomastix mesnili* or *Giardia lamblia.* In all recorded investigations in endemic dysentery areas it is noteworthy that infections due to Flexner bacillus have been found to be much more common than those due to Shiga bacillus. KLIGLER found that in septic tanks bacilli of typhoid-dysentery group were rapidly destroyed by the high alkalinity (pH 8·8–9·0) of effluent, and that Shiga bacillus succumbed most rapidly. Further, in dry privies reaction of soil was of utmost importance, determining viability of these bacteria, which was much shortened in acid soils (pH 4·8–5·0); in this case also Shiga bacillus was found to be more sensitive to these changes in reaction.

The rest of the paper deals with food poisoning.

H. M. H.

OLITZKI (Leo) & REICH (Karl). Untersuchungen ueber Amöben- und Bazillenruhr in Palästina. [**Investigations of Amoebic and Bacillary Dysentery in Palestine.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. June 28. Vol. 112. No. 6/8. pp. 507–519. [3 refs.] [Hyg. Inst., Hebrew Univ., Jerusalem.]

The authors note that WENYON, MANSON-BAHR, CUNNINGHAM and other workers have shown bacillary to be the commoner dysentery, as compared with amoebic, in the Near East. W. BRUNN (1920) confirmed this finding for Palestine. In this long paper the authors record fully, with data presented in many tables, the result of their investigation of dysentery in Palestine.

Bacillary dysentery shows two epidemic peaks, one in spring and the second in autumn. The authors state that these are seasons when the populace, including the children, are prone to a non-infectious diarrhoea. The bacillary dysentery cases were usually acute, with muco-sanguineous stools. About 20 per cent. of all cases were in children ½ to 2 years old.

Amoebic dysentery. Most cases were diagnosed in midsummer, a season, they state, when there is but slight tendency to diarrhoea. The amoebae were very often found in normal or nearly normal stools. The question arises if these were new or chronic latent infections. Only about 3 per cent. of cases occurred among children ½ to 2 years old.

Other gut protozoa.—Flagellates were found mostly in children 1 to 3 years old. Non-pathogenic amoebae were found mostly in adults. A noteworthy finding was cyst carriers in Tiberias 20 per cent., in Tel-aviv 3 per cent.

H. M. H.

FETTWEIS (Minna). Beiträge zur sogenannten nodulären Ruhr. [**So-called Nodular Dysentery.**]—*Frankfurter Ztschr. f. Path.* 1928. Vol. 36. No. 1. pp. 113–122. [6 refs.] [Path. Inst., Med. Academy, Düsseldorf.]

Describes and discusses very fully histological investigation of the "nodules" found in the dysenteric gut wall. The author concludes that the small suppurating foci in the submucosa are probably caused by secondary invading bacteria. The base of these foci is a lymph follicle or, often, the submucosal connective tissue. These small submucosal abscesses form eventually the large flask-shaped ulcers.

H. M. H.

WEITZMAN (I.). **Note on Rivanol in Treatment of Dysenteries.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. June 25. Vol. 23. No. 1. p. 101. [1 ref.]

The author notes that the brilliant results obtained with rivanol as reported by WAGNER, SCHAUMANN and PETER [see above] aroused hopes of enrichment of the arsenal of antidysenteric remedies. He, therefore, tried the drug in :—

(1) *Four cases of dysentery in which vegetative amoebae were present,* as verified by staining with iodine and with haematoxylin, and by microscopical examinations twice daily. 0·05 gm. of rivanol dissolved in an ounce of thick syrup was given thrice daily and once at night. After 6 days of this treatment number of stools had not diminished; vegetative forms were still present and as active as before. On seventh day rivanol was omitted and under other "routine" treatment the cases "cleared up immediately."

(2) *Three cases of Shiga bacillus, and eighteen cases of Flexner bacillus dysentery*: "Not the slightest effect could be noted in the former." In the latter, except for those mild ones that would have recovered anyhow, he had after seven days to discontinue rivanol and revert to "routine" treatment.

(3) *Two cases of lambliosis*—rivanol per os was without the slightest effect.

However, "in many of these cases [presumably of dysentery] rivanol had a mild sedative effect."

H. M. H.

MÜHLENS (P.). 8 Jahre Yatrenbehandlung der Amöben- und Bazillendysenterie und ihrer Folgen. [**Eight Years Yatren Treatment of the Dysenteries and its Results.**]—*Deut. Med. Woch.* 1929. Jan. 11. Vol. 55. No. 2. pp. 49–53. With 7 charts in text. [1 ref.] [Inst. for Ship & Trop. Diseases, Hamburg.]

This paper is itself a summary account of the favourable experiences of yatren of various authors in many countries during the last 8 years in the treatment of dysentery. The author sums up his summary—that to-day, yatren 105 is the best remedy for acute and chronic amoebic dysentery at all ages, and for its sequelae, e.g., colitis ulcerosa membranacea, spastic obstipation: and for cyst passers without symptoms. Some cases do best on yatren by mouth, others on yatren per rectum, and others again by combining these two methods of administration. Clinical symptoms, and *E. histolytica* and its cysts, disappear in a few days after the start of yatren treatment. Yatren also rapidly causes disappearance of the "minuta" forms of *E. histolytica*; and also *E. coli*; *Endolimax nana*; Iodamoeba; and *Balantidium coli.* Yatren gives uncertain and impermanent results with Lamblia and Trichomonas infections—but better results with Blastocystis, Councilmania, and Chilomastix. In bacillary dysentery, notably in Shiga-Kruse infection, and its sequelae, yatren has procured noteworthy cures. In various regions yatren has proved an effective prophylaxis against dysentery (2–4 pills a day twice a week). Yatren has been shown everywhere to be nontoxic in daily doses of 10–12 gm. even 1·5–3·8 per os, or in clyster has proved therapeutically effective.

H. M. H.

JACOBY (Curt). Ueber Spirocid bei Behandlung von Amöbendysenterie und ruhrähnlichen, durch andere Protozoen hervorgerufenen Darmerkrankungen. [**Spirocid in the Treatment of Amoebic Dysentery and Other Protozoal Intestinal Affections.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Mar. Vol. 33. No. 3. pp. 135–152. [12 refs.]

The author describes fully his observations on the effect of treatment by spirocid (4-Oxy-3-acetylaminophenylarsin-acid) of 70 cases, 28 women and 42 men. Tablets of 0·25 gm. were given by mouth usually three times a day. 43 were cases of infection with *Entamoeba histolytica*; 8 of *E. histolytica* and Trichomonas; one case of clinical amoebic dysentery and Trichomonas; 3 cases of Lamblia; 2 cases of Lamblia and Trichomonas; and 13 cases of Trichomonas infection. 60 cases responded quickly by relief of symptoms, disappearance of the parasites from stools, and return of stools to normal appearance, after spirocid treatment for 3 to 4 days. Treatment was given for one week. Of the remaining 10, 1 case developed spirocid intoxication—dermatitis and fever; (the author records that this toxic manifestation has occurred far more frequently in his hands when using stovarsol). Of the 9 others, only 1 responded well to emetine. The remaining 8 were treated with various dysentery remedies, but showed only slow recovery. In these 10 spirocid-resistant cases were 4 of *E. histolytica* and Trichomonas infection. Seven were women who, with the three men, were all in very weak and wasted condition at commencement of spirocid treatment. The author found spirocid to be effective in getting rid of Lamblia and Trichomonas infections.

H. M. H.

CHOUDHURY (B. K. Pal) & MORISON (J.). **The Spread of Dysentery in a Khasi Village and its Treatment with Bacteriophage.**—*Indian Med. Gaz.* 1929. Feb. Vol. 64. No. 2. pp. 66–67. [Pasteur Inst., Shillong, India.]

Investigation showed that the epidemic was in all probability water borne. The hillside pool from which drinking water was led by a bamboo pipe was continually infected by pigs that had fed on dysenteric stools. When the pool reservoir was fenced round the epidemic ceased. 43 samples of stool were sent to the Pasteur Institute, Shillong—a 24 hours' journey—yet *Bact. dysenteriae* Shiga was isolated three times, and Flexner four times.

The object of Dr. Choudhury's visit was to test use of bacteriophage under village conditions. Six villagers were each placed in charge of five houses and the bacteriophage diluted with water was sent round in bottles; 2 cc. in 4 oz. water was given to every sick person on the first day three times, and subsequently twice daily. They were given water *ad. lib.* but the only diet available was boiled rice and water paste.

	Severe.	*Moderately severe.*	*Mild.*
Number of cases ...	18 ...	19 ...	43
Deaths	3 ...	0 ...	0

H. M. H.

KRIEG (F.). Chronische Gelenkerkrankungen nach Infektionskrankheiten. I. Chronische Gelenkerkrankungen nach Ruhr. [**Chronic Joint Affections after Dysentery.**]—*Ztschr. f. Wissenschaft. Bäderkunde.* Berlin. 1927. July. Vol. 1. No. 10. pp. 606–616.

The author describes cases of chronic rheumatism and arthritis after dysentery and their treatment by the Baden-Baden 'cure', including special baths. He has found that the cases give agglutination reaction over long periods with dysentery bacilli, thus establishing their etiology. The most severe cases are due to Shiga-Kruse strains. The cases show definite anaemia and atrophy, the clinical picture resembling acute anterior poliomyelitis. The arthritis of bacillary dysentery is a febrile illness of long duration and obstinate symptoms. There is usually polyarthritis especially of lower limbs. The disease picks out serous cavities and mucous membranes such as conjunctiva and urethra. The clinical picture is that of infectious exudative polyarthritis. In contrast to what occurs in acute rheumatism, the heart is seldom affected. Salicylates are without effect on the illness.

H. M. H.

ONGKIEHONG (H. F.). Santoninebehandeling bij Balantidiosis. [**Santonin Treatment in Balantidiasis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Jan. 21. Vol. 69. No. 1. pp. 62–64. [4 refs.]

Three cases of balantidiasis were treated with santonin, 3 times per day, 25 mgm., on 2 consecutive days. In two cases (a light diarrhoic one and a dysenteric one) the treatment yielded a quick and favourable result. In another patient, suffering from pulmonary tuberculosis, the santonin cure failed; probably the parasites were settled in deep (tuberculous?) ulcers of the gut; they finally disappeared after a yatren cure. In a previous case of the author's and in one of BRUG's santonin treatment was efficacious. The author considers it an important addition to our therapeutic arsenal.

W. J. Bais.

BENEDETTI-VALENTINI (Fabiano). Ascesso epatico da dissenteria amebica rotto nella cavità peritoneale e guarito con l'operazione.—*Policlinico.* Sez. Prat. 1929. Aug. 5. Vol. 36. No. 31. pp. 1095–1099. With 1 text fig. [8 refs.]

BUCHHOLZ (Leo). Klinische Besonderheiten der Ruhr im Säuglingsalter.—*Monatssch. f. Kinderheilk.* 1927. Vol. 36. pp. 351–357. [6 refs.]

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DAVIS (Oscar). Amebic Abscess of the Liver rupturing through the Lungs. Report of an Unusual Case.—*U.S. Nav. Med. Bull.* 1929. Jan. Vol. 27. No. 1. pp. 130–132.

DAVIS (W. D.). Report of an Epidemic of Dysentery.—*U.S. Nav. Med. Bull.* 1929. Apr. Vol. 27. No. 2. pp. 382–386.

ERISTAWI (K.). [Atypische Leberabszessfälle.]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1929. Feb. Vol. 2. No. 2. [In Georgian script. German summary pp. 181–182.]

HILLERET. Quelques considérations médico-militaires sur la dysenterie amibienne.—*Ann. de Méd. et de Pharm. Colon.* 1928. Oct.–Nov.–Dec. Vol. 26. No. 4. pp. 418–426.

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PETZETAKIS (M.). La cholécystite amibienne calculeuse. Présence d'amibes dans le pus d'un cas de cholécystite calculeuse purulente.—*Rev. Méd. et Hyg. Trop.* 1929. Jan.–Feb. Vol. 21. No. 1. pp. 22–24. [5 refs.]

ROSENBAUM (S.). Zur Differentialdiagnose der Säuglingsruhr. Bemerkungen zur Arbeit von Leo BUCHHOLZ in dieser Zeitschrift Bd. 36, S.351. 1927.—*Monatssch. f. Kinderheilk.* 1928. Mar. Vol. 38. No. 3. pp. 213–214. [3 refs.] [Children's Clinic, Univ., Leipzig.]

TÖRÖK (G.). Zur Differentialdiagnose der Säuglingsruhr. Bemerkungen zur Arbeit L. BUCHHOLZ und S. ROSENBAUM in dieser Zeitschrift Bd. 36 und Bd. 38.—*Monatssch. f. Kinderheilk.* 1928. June. Vol. 39. No. 3–4. pp. 325–326.

ZSCHUCKE (Johannes). Las modernas investigaciones sobre la amebiasis humana y su importancia para la lucha contra esta enfermedad.—*Medicina Países Cálidos.* Madrid. 1929. May. Vol. 2. No. 3. pp. 209–220.

MALARIA.

LEAGUE OF NATIONS. **Health Organisation. Report on the Work of the Malaria Commission at the Conference held in Geneva, June 25th-29th, 1928.** C.H./Malaria/121. 22 pp. 1928. Geneva.

This Conference discussed the following principles set out in the Second General Report of the Malaria Commission (see this *Bulletin*, Vol. 25, p. 115.) :—

(1) In Europe, correct antimalaria practice is an endeavour to reduce the incidence and severity of the disease ; measures aiming at eradication can seldom be justified.

(2) It is not always necessary to deal with malaria by a method arising directly out of the knowledge that the disease is transmitted by mosquitoes.

(3) In every place there must be a preliminary examination to ascertain the method best suited to it.

(4) It cannot be said that there is any one method of malaria control superior to all others.

Three Sub-Commissions were set up, to facilitate the task of the Conference. The first dealt with the methods suggested in the second general report for employment in antimalarial work ; the second considered epidemiological aspects ; the third discussed the use of quinine in treatment. Their reports were submitted to the plenary session and were adopted.

(*a*) The conclusions of the first Sub-Commission "express the agreement reached by malariologists from the old and new world on the principles of dealing with malaria." They were as follows :—

" Each Government should establish a central permanent organisation, either independent or attached to an institute, composed of several selected workers who would devote their whole time to malaria research and would act as scientific advisers." The method of control must be adapted to the exigencies of the particular region where it is applied, and must be thoroughly tried before it is decided if it is efficient and suitable to the district ; it should not be condemned because it is not immediately successful. " The principal factor in the success of any method is the energy of the hygienists employing it. . . . The Sub-Commission is not in favour of utilising all available methods of control in the same locality at the same time. It considers it preferable to employ only the method or methods which, with the means available, can be brought above the standard called ' minimum effective degree of perfection.' This must be reached before its effect on incidence becomes appreciable. . . . The description of antimalarial measures applied for a longer or shorter time in various countries, such as Italy and the U.S.A., attracts attention to the method applied and the results obtained, and there is a great temptation to imitate one or other of these models. Imitation in antimalarial work is dangerous. . . . The Sub-Commission deprecates the use of measures in one region solely on the ground that they have been successful in another. . . . Whatever other means may be employed in malarial localities the Sub-Commission considers that it is essential in the first place to treat the sick. . . . The good result of early diagnosis and efficient treatment are more apparent in the reduction of the severity of the disease than in the reduction of its incidence. . . . " Integral bonification," which may be regarded as the final object of all antimalarial measures, requires a long period for its accomplishment. Extensive undertakings may provoke a temporary local increase in the amount of malaria. . . . The improvement of the conditions of the inhabitants which results from the development of widespread " boni-

fication" is one of the determining factors in the regression of malaria. The work done is only efficacious in-so-far as it leads to intensive cultivation of the ground. It is certain, however, that the use of anti-larval measures, whilst more extensive works are being carried out, is of great value inasmuch as it reduces the anopheline density and serves to bridge the dangerous period which accompanies and follows such undertakings."

(*b*) The second Sub-Commission, which considered the epidemiology of malaria, were of opinion that "in general, historical records of mortality statistics do not provide a good method of ascertaining the distribution and character of malaria, and the result of their use as an indicator of success in anti-malarial measures may be very misleading." The following subjects of research were suggested :—

I. Studies relating to the Biology of Anopheles.

"1. Pathogenicity of the various plasmodia to anopheles; can an intense infection produce sterilization of the mosquitoes and modify the migration of these insects ?

"2. Domestic malaria and proofs of the permanent domesticity of anopheline carriers of malaria.

"A. Domesticity of the various species of anopheles.

"B. Changes in adaptation of anopheles of a given species according to the varying conditions of their 'habitat.'

"C. Means of estimating the degree of domesticity of a given species of anopheles.

"D. Importance of 'peridomestic' collections of water and their relationship to the 'habitat' of adult anopheles.

"3. Study of certain facts influencing the biology of anopheles and their relationship to the efficacy of anti-larval measures :

"A. Degree of permanence of collections of water used as breeding places.

"B. Mechanical limitation of the migration of anopheles :

(i) Length of flight.
(ii) Altitude.
(iii) Wind and other meteorological factors.
(iv) Forests, etc.

"C. Biological obstacles to the migrations of mosquitoes :

(i) Inhabited houses.
(ii) Stables, animal sheds, etc.

"4. Study of the various factors which cause 'anophelism without malaria,' *i.e.*, which prevent the local anopheles from acting as malaria vectors.

"This enquiry should be carried out particularly in districts where the phenomenon occurs and which border upon areas where malaria is endemic. Efforts should be made to ascertain whether any of the factors claimed to be the cause of the phenomenon are operative in the country under observation and the investigation would be especially concerned with the following subjects :

"(*a*) Differences in the anopheline density of the malarious and non-malarious regions.

"(*b*) Morphological and biological differences of the anopheline population of these regions, especially with regard to selection of food (animal or human blood), shelter (animal or human habitations), and breeding-places (hydro-telluric conditions).

"(*c*) Differences in relation to receptivity, of both anopheline faunas, with regard to malarial infection.

"(*d*) Differences in relation to the human host and its surroundings:

(i) Numerical relationship of anophelines in contact with man and animals in stables, especially such animals as may be shown to be attractive to anopheles by means of the precipitin test.

(ii) Conditions of housing, especially with regard to the shelter offered to anopheles.

"*Note*: It is understood (1) that these factors are not necessarily the same in the various regions; (2) that it is essential for the present not to take it for granted that an explanation obtaining in one region holds good in another, however feasible it may be; (3) that it is only after the determination of such factors in many localities that it will be possible to determine the fundamental cause of the phenomenon.

II. Studies relating to Malaria in Man.

"1. Possibility of persistence of the capacity for evolution of gametes derived from an individual treated with quinine. This knowledge is necessary for an accurate estimation of the value of quininisation in infections by the various species of plasmodia.

"2. Climatic and seasonal influences on schizogonic development of the various plasmodia.

"3. Study of haemoglobin in the course of malarial infection and during treatment.

"4. Determination of a method of distinguishing:

"A. Primary infections.

"B. Re-infections.

"C. Relapses.

III. Studies dealing with Anti-Malaria Measures.

"1. Factors in the so-called 'spontaneous regression' of malaria:

"A. Value of the data on malaria contained in vital statistics.

"B. Experimental study of the factors involved in 'complete bonifications' in the diminution of endemic malaria.

"C. Influence of ricefields.

"D. Influence of the cultivation of other irrigated crops.

"2. Study of the various methods of destroying anopheles in dwellings without injuring the contents of the rooms.

"3. The determination, in each country and region, of the domestic animal which attracts anopheles most and the correlation between this fact and malaria prevalence.

"4. Is the development of zygotes inhibited by the absorption of animal blood by the infected anopheles during this development?"

(*c*) The third Sub-Commission considered the use of quinine in malaria. They were of opinion that the dose employed for the treatment of the attack must depend "on the form of the parasite, the nature of the disease, and the character of the epidemic." They recommended that treatment should be continued for four to six weeks after the cure of the acute attack by a daily dose of 1 gram of quinine, with intervals of three or four days during the second half of the period. The Sub-Commission recommended that experiments should be continued with kinetum extracted from different varieties of bark, with the secondary alkaloids of cinchona, and with other substances, notably plasmoquin and quinio-stovarsol.

A plan for the international study of malaria was drawn up at the Conference and problems were allotted to malariologists in different countries.

William Fletcher.

ANDERSON (T. F.). **Some Investigations into the Incidence of Malaria in the Teita District.**—*Kenya & East African Med. Jl.* 1929. Apr. Vol. 6. No. 1. pp. 2–11. With 2 graphs in text.

Dr. Anderson examined a number of natives in the Taveta, Dabaida, and Sagalla native reserves in the Teita district. The Taveta reserve is a small, fertile area about ten miles long, consisting largely of forest, on the Tanganyika border of Kenya. More than 90 per cent. of the children were found to have enlarged spleens, and over 60 per cent. had parasites in their blood. The common anopheline caught in houses was *A. funestus* (99 per cent.); there were also a few *A. costalis*. "It is considered that malaria is by far the most important factor in causing the high infant mortality and decreasing population." The Dabaida and Sagalla reserves are situated in hilly country. Malaria is endemic below 3,600 feet and the spleen rate is 30 per cent. At greater altitude it is uncommon and the spleen rate is only 0·2 per cent. *A. funestus* and *A. rhodesiensis* were present at all altitudes, but *A. costalis* was found only in the most heavily infected areas. W. F.

CAMPBELL (J. McP.). **Malaria in the Uasin Gishu and Trans Nzoia.**—*Kenya & East African Med. Jl.* 1929. May. Vol. 6. No. 2. pp. 32–43. With 1 chart.

Malaria is a grave menance to the development of these fertile districts in the highlands of Kenya.

The river Nzoia rises in the Charangani hills and flows westward through a fertile plateau nearly 3,000 square miles in extent, situated on the Equator in the north-west corner of Kenya, some 6,000 feet above sea level. The district north of the river is called Trans Nzoia, that to the south is the Uasin Gishu. The European population, in 1926, was 2,500. Dr. Campbell sketches the history of malaria in the plateau and suggests its causes and remedies. It is the usual story of malaria in a newly opened country; the first settlers went there in 1906, and, for the first twenty years, there was very little malaria, so little indeed that they did not even use mosquito nets. Yet there was always a little, and now and then a case of blackwater. The disease was "biding its time," as Dr. Campbell says, and, in 1926, "the incidence and mortality of blackwater fever among Europeans had so greatly increased as to cause a slump in the price of land." The year 1928 was still worse, there was a very severe outbreak and few people in Eldoret or Kitale escaped. Dr. Campbell considers that the disease is "incidental to the early stages of development," and that the outbreak of 1928 was largely due to lowered resistance and lack of proper food, following a seven months' drought. He urges that all should take personal protective measures against infection, and that settlers should endeavour to produce vegetables, fruit and milk for their own use, in addition to commercial crops such as maize. He attaches great importance to the creation of a native, farm-labourer class resident on the farms, and to the better housing and feeding of native labourers. In short, he counsels the European settlers to live less carelessly and to pay more reasonable attention to their own health and to that of their labourers. He concludes that, "given the immigration of more settlers, with capital, energy, and a knowledge of farming, to carry on and extend the work of the earlier pioneers, there can be no doubt as to the eventual prosperity and attendant healthiness of the district." W. F.

THOMSON (John Gordon). **Endemic and Epidemic Malaria in Southern Rhodesia.**—*Proc. Roy. Soc. Med.* 1929. June. Vol. 22. No. 8. pp. 1051–1056 (Sect. Epidem. & State Med. pp. 49–54). With 2 charts in text. [9 refs.]

Dr. Thomson began his lecture with a brief account of Southern Rhodesia which he described as a plateau about twice the size of England, nearly a quarter of which is over 4,000 feet above sea level. Though it is situated within the tropical belt he considers that the climate in most areas is ideal for Europeans. The annual rainfall is from 21 to 37 inches; almost all of it falls during the hot season, between October and March, when the mean maximum temperature is above 80° F. and the mean minimum about 60° F. The population numbers about a million, some 50,000 of which are whites. The natives are allocated in Reserves but, as labourers, they come into contact with the whites. Malaria is hyper-endemic in many places and it is almost all of the subtertian type. It reaches its maximum each year during March, April and May, and the amount is directly dependent on the rainfall. The worst malarious areas are the fertile river valleys, occupied by European settlers, at an altitude of about 3,000 feet, and blackwater fever is common there. The native children in the hyper-endemic areas (i.e., spleen-rate over 50) are the chief infectors of anopheles. Up to the age of two years they suffer from " acute infestation " with enormous numbers of asexual parasites, and many of them carry crescents. Dr. Thomson found 40 per cent. with crescents, in single examinations of one hundred children. Those who survive gradually develop a tolerance; when they reach adult age, they all harbour parasites in very small numbers (" immune infestation ") but crescents are seldom found.

Dr. Thomson examined 106 white children in three hyper-endemic areas where Europeans had settled, with the following results:—All but two gave a history of malaria, 83 had enlarged spleens, and 9 had suffered from blackwater fever. He considers that " considerable carelessness in the choice of the site for their houses, and gross neglect of recognized anti-malarial measures, are still displayed by many settlers in the rural areas." He found that the chief anopheline associated with malaria was *A. costalis*. It appears late in November and is killed off in June by the sudden fall in the temperature. This anopheles is stealthy in its habits, silent in its flight, and difficult to find. " The inhabitants of unscreened, blackwater houses, as often as not, will state that they seldom see mosquitoes and are not bitten." Dr. Thomson hunted for mosquitoes in one of these houses without success, but by covering the bedroom window with netting before sundown he was able to capture, on the inside of the net, a number of anopheles which had been hiding in the house during the day and tried to fly out at sunset. His observations led him to conclude that most of the malaria in Southern Rhodesia is contracted when the inhabitants are asleep in bed. The large towns such as Salisbury and Buluwayo are practically free from malaria, but in the widely scattered farms of the rural districts the problem is very difficult. Dr. Thomson considers that " well-built and carefully screened houses, and the rigid use of efficient mosquito nets undoubtedly constitute one of the best methods of protection in the rural districts." He concludes that there is little doubt that malaria and blackwater fever will become, in the process of civilization and the development of Southern Rhodesia, comparatively unimportant diseases. W. F.

BOSE (K.). **Proceedings of a Conference held at Birnagar (Bengal) on Sunday, the 24th February, 1929, at 2-30 p.m., to discuss the Problem of Malaria Control at Birnagar.**—*Indian Med. Gaz.* 1929. June. Vol. 64. No. 6. pp. 323–328. With 3 text figs.

This Report contains a most interesting observation. There is a number of lakes, or tanks, at Birnagar, which are always stocked with edible fish. These tanks have been oiled because anopheline larvae breed in them, untouched by the fish. The result has been most unfortunate; Mr. Bose, the Honorary Secretary of the Palli Mandali; writes, "the fish swallow up the oil, imbibe its smell, and retain it even when cooked for the table. The smaller varieties of fish cannot be eaten owing to the smell, while the larger varieties imbibe the smell in their heads which have to be rejected. . . . It seems doubtful whether we are justified in causing serious injury to the fishing industry of the village." The Proceedings show that valuable anti-malarial work is being carried on in Bengal by voluntary agencies. Anti-larval measures have not produced any tangible result in Birnagar, but steps are being taken to determine the principal carrier, and, when this has been done, efforts will be concentrated on the control of this species. The evidence, so far points to *A. philippinensis* as the culprit.

W. F.

MADRAS: KING INSTITUTE OF PREVENTIVE MEDICINE, GUINDY. Supplement to Ann. Rep. for 1927–28. pp. 2–22. With 4 figs. on 1 plate, 2 maps & 2 charts.—**Malaria Surveys of Mopad, Duttalur and Udayagiri in 1926 and 1927.** [KING (H. H.) & others.]

The Mopad area in the Nellore district of Madras is a dry, barren country; because famine occurred, a reservoir was built by damming the river and the land was irrigated from this source in 1921. Since then, wet padi has been cultivated, and when Assistant Surgeon K. V. KRISHNAM made a malaria survey he reported that "the people seem to be fairly well off," though they sell the rice they grow and eat millet. Malaria, chiefly subtertian, was found to be very prevalent; the principal carrier proved to be *A. culicifacies*, seconded by *A. stephensi* and *A. listoni*. The breeding places were pools in the old river bed below the dam, the irrigation canals and seepages from them. Col. King and his assistant attribute the prevalence of malaria to the raising of the subsoil water, by the installation of irrigation without the provision of adequate drainage.

W. F.

STRICKLAND (C.). assisted by CHOUDHURY (K. L.) in collaboration with others. **A Report on a Mosquito-Malaria Survey of the Duars Tea Gardens. Including a Note on the Anopheline Larvae found in Borrow-Pits by** S. KINGSLEY-WARD **and Some Factors in the Epidemiology of Blackwater Fever in the Duars by** Oliver MCCUTCHEON.—pp. iv+145. With 3 figs.

A large part of this Report is occupied with extracts from the publications of other workers and with a critical examination of the recommendations made by CHRISTOPHERS and BENTLEY, in 1909, with reference to malaria in the Duars. Dr. Strickland does not agree that the condition of squalor and neglect noted by these authors in the

crowded labour camps had anything to do with the excessive sickness from malaria, or that the removal of these conditions (which he calls bonification) has been worth while. He states that "the well-housed, highly-paid, and pampered planter, and the bloated babu are as seriously affected as the labourer," but he does not support this statement by figures showing the death-rates from malaria in these groups. He goes on to say that the coolies on many of the rubber estates in Malaya " live in ' labour camps ' of a more exotic character than any the Duars coolies are ever forced to occupy, and yet, in certain wide tracts their consequential social and economic condition does not lead to the slightest amount of malaria." This statement is incorrect if it is meant to imply that the coolies on many of the rubber estates are living in squalor and neglect, but free from malaria. Dr. Strickland states that the appearance of the coolies, in the tea-gardens of the Duars to-day, reflects their general contentment and prosperity but that the spleen index is as high as it was when CHRISTOPHERS and BENTLEY made their survey twenty years ago. Surely it has been worth while to improve the conditions of labour if it has made the coolies contented and prosperous and anxious to remain in the country.

A. maculatus was found in the highest zone of the tea-gardens, under the foothills of the Himalaya, where the fluctuation in the amount of surface water was most considerable. *A. funestus* was found in the perennial streams of the lowest zone, nearest the plains. *A. culicifacies* in the intermediate zone, breeding in the pools left in the river-bed when they dried up after the rains, and also in the streams which form at the beginning of the rains. These three mosquitoes were considered the principal carriers, but lack of staff prevented a search for zygotes and sporozoites. Dr. Strickland adds, " we think it possible that *umbrosus* may be present and conclude that as it is a carrier the jungle is a danger."

The spleen-rate on some tea estates was much higher than on others ; it was difficult to find a reason for this and in attempting to explain a spleen-rate of 86 on one block of estates, and one of only 47 on another, Dr. Strickland attributes the difference to an error due to the small numbers examined.

Among the recommendations made at the end of the Report, there are two which are unlikely to meet with general approval : the first is that quinine tannate might be used with advantage for dosing everybody with the object of " sterilising the reservoirs of the parasite so that the mosquito cannot become infected." The second is under the head of " Measures of protection to the individual from the bite of the infected mosquito " and is to the effect that, " there is no reason why coolies should not be salted artificially as are Queensland bulls with *Piroplasma bovis.*"

W. F.

HINDLE (Edward) assisted by CHOW (Feng Lan). **Experiments with Malaria and Mosquitoes in Shantung, China : with a Note on the Value of Local Species of Fish for the Destruction of Mosquito Larvae.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. June 25. Vol. 23. No. 1. pp. 71–80. [26 refs.]

These experiments were made at Tsinan, in the Province of Shantung. Endemic malaria is not at all common, in spite of marshy land and numerous springs around the lake within the walls of the city. In

September, some waters swarm with the larvae of mosquitoes, but others are entirely free ; this Dr. Hindle attributes to the presence of small fish which devour them. Only two species of anopheles have been found in Tsinan ; they are *A. hyrcanus*, var. *sinensis*, and *A. pattoni*. In order to determine their importance as carriers of malaria, laboratory-bred mosquitoes of these species were fed on a case of benign tertian malaria in the hospital of the Shantung Christian University. Only twenty out of 121 *A. hyrcanus* became infected, or about 16·5 per cent. ; in contrast to this, nine out of eleven *A. pattoni*, or 82 per cent., were infected by feeding on the same patient. The authors conclude, as the result of these experiments, and because *A. hyrcanus* (though the most common local anopheline) is rarely seen inside any building, that *A. pattoni* is the most important agent in the spread of malaria in North China.

The almost universal absence of mosquito larvae from streams inhabited by small fishes led the author to make experiments to determine which were the most efficient destroyers of larvae. For this purpose, single fish were placed in glass jars and numbers of culex larvae were introduced from time to time. All the seven species which were tested, devoured the larvae readily, but two species, *Pseudogobio sinenis* and *Eleotris swinhonis* were the most efficient.

W. F.

WALCH (E. W.) & SOESILO (R.). **Annotations from Everywhere about Malaria in the Netherlands Indian Archipelago. I.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 1. pp. 199–207. With 3 plates. [6 refs.] [Med. Lab., Weltevreden.]

This paper records the finding of *A. ludlowi* for the first time in Dutch Borneo. With regard to the morphological character of the wings, the Borneo species appears to occupy a position intermediate between the *ludlowi* of the Philippines, to the north, and the *variatio sundaica* of the Soenda Islands to the south. The authors state that, formerly, the presence of *A. ludlowi* in the Dutch Archipelago has meant the prevalence of serious malaria ; but on the north-east coast of Atjeh they were surprised to find that " *A. ludlowi* occurs in great quantities without the population suffering badly from malaria." and they suggest that it may be more zoophilous here than elsewhere.

They find that *A. sinensis* is the chief carrier in the interior of southern Sumatra. Large numbers were detected and infected specimens were discovered. It was found breeding in rice-swamps and other stagnant, overgrown, fresh-water collections.

A. maculatus, the most dangerous carrier in the Federated Malay States, occurs in the Dutch Indies ; but it is of little importance there, and no infected specimens had been found until April, 1928, when the authors found 4 containing zygotes, among 135 taken among the terraced rice-fields (there is running water in terraced rice-fields) at Batoen, in Java, 3,000 to 4,000 feet above sea level. *A. aconitus* also was found breeding there. The authors also discovered *A. fuliginosus* for the first time in Borneo, and confirmed the occurrence of its larvae in brackish water. Infected *A. umbrosus* were caught on the island of Banka, in the neighbourhood of the tin mines.

W. F.

ESSED (W. F. R.). **Malaria at Banjoewangi and the Prospects of an Efficient Species Sanitation.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 1. pp. 184–198. With 2 maps & 1 fig. on 3 plates. [3 refs.]

Banjoewangi is on the east coast of Java at the mouth of a river, very little above the level of the sea. The dangerous carrier *A. ludlowi* does not breed in the lagoon which the tide keeps free from algae, but the natives have surreptitiously constructed large numbers of fish ponds by throwing up embankments which keep out the tide. Floating algae cover these ponds and *A. ludlowi* breed in enormous numbers. Dr. Essed is confident that malaria can be greatly reduced at a small cost by destroying the embankments, the other species of anophelines in the district being comparatively unimportant.

W. F.

SCHUURMAN (C. J.) & HUININK (A. Schuurman-ten Bokkel). **A Malaria-Problem on Java's South-Coast.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 1. pp. 120–142. With 1 folding plan & 5 figs. on 3 plates. [1 ref.]

A certain Company, with a large concession of land, has found it very difficult to obtain labour owing to malaria. Their estate is on the borders of a great swamp through which runs a river, blocked at its mouth by a wall of stones and sand thrown up by the sea. The Company, thinking that their troubles are due to the swamp, have offered to drain it if the Government will give them a long lease of it, for the ground will be very fertile. The Government thinks of draining it themselves, because more than 1,000 acres of rice could be planted there by the natives. The authors were requested to make a survey in order to determine if the swamp was the cause of the epidemics of malaria in the district. This they did, and found that no dangerous mosquitoes were breeding in the swamp itself. *A. aconitus*, the principal carrier, was breeding in the small running streams that fed the river; *A. ludlowi* was breeding near the mouth of the river, near the sea, where it was blocked and full of algae. Various remedies are discussed by the authors, but whether they are practicable or not depends on how much money the Company or the Government is prepared to spend.

W. F.

SOESILO (R.). Uittreksel uit het rapport omtrent het onderzoek naar de verspreiding van de malaria op het eiland Nias.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Apr. 10. Vol. 69. No. 4. pp. 350–368. With 2 folding maps. [Med. Lab., Weltevreden.]

——. **Abstract from a Report about the Spreading of Malaria on the Island Nias.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 1. pp. 85–110. With 2 folding maps. [Med. Lab., Weltevreden.]

The island of Nias on the west coast of Sumatra is hilly, except for the east and south-east where there is a rather extensive swampy coastal plain. Here malaria causes a high spleen-rate: 96 per cent. among children, 92 per cent. among adults. The parasite-rate in both groups is 48 per cent. and 18 per cent., the crescent-rate 21 per cent. and 4 per cent. In the hills the spleen-rate (31 per cent.

and 40 per cent.) and parasite-rate (14 per cent. and 7 per cent.) are much lower and simple tertian (50 per cent.) predominates, whereas subtertian (71 per cent.) prevails in the plains.

A. ludlowi, Theob., is the principal carrier in the plains; 10 out of 301 were found infected. Of the other Anophelines examined in sufficient numbers, *A. punctulatus*, Dö var. *tesselatus*, Theob., was found infected once (out of 197); none of 230 *A. Kochi*, Dö, harboured parasites. Larvae of *A. ludlowi* were collected in the coastal swamps, which were cleared for cultivation (badly kept rice-fields); no breeding occurred in the uncleared shady swamps. The larvae were not confined to brackish water but were found also, and in great numbers, in an impounded freshwater lake in the hills, in the vicinity of the coastal plains.

The hill malaria is probably transmitted by *A. maculatus*, Theob., which was found in 505 out of 679 breeding-places examined there.

Other Anopheline species, besides those mentioned, are: *A. barbirostris* v.d.W., *A. hyrcanus* Pall., *A. umbrosus*, Theob., *A. aitkenii*, James, *A. leucosphyrus*, Dö.

N. H. Swellengrebel.

Ottolenghi (D.) in collaboration with Bonalberti (E.) & Brighenti (D.). Le condizioni della malaria e la lotta antimalarica nelle bonifiche ferraresi. (Relazioni per gli anni 1927–28). (**Malaria Conditions and Malarial Control in Ferrara Province after the Agrarian Sanitation Works.**)—*Riv. di Malariologia.* 1929. Mar.–Apr. Vol. 8. No. 2. pp. 113–148. With 2 figs. [17 refs.] [English summary p. 235.]

Malaria in three zones is discussed: Diamantina, Jolanda di Savoia, and Gorino. *A. maculipennis* was present throughout the whole period, but *A. algeriensis* and *A. bifurcatus* were scarce in proportion at any time and disappeared in April and May respectively. Anopheles were found in the houses.

In Jolanda the incidence of malaria fell from 2·5 in 1927 to 0·9 per cent. in 1928, in Diamantina from 38·2 to 24·4 per cent., and in Gorino from 46·6 to 25·3 per cent. In the first named "bonification" was much more thoroughly carried out; water supplies and accumulations were attended to, cattle-stalls regulated, dwellings made lighter and more sanitary, mosquito destruction more energetically pursued and sanitation generally improved.

The extent of flight and migration of mosquitoes were estimated. The longest flight was 7 kilometres.

Both at Jolanda and Diamantina mosquitoes recaptured in the flight experiments were found to have fed on bovines rather than on man. In one only of 130 examined by precipitation tests, did the blood prove to be human.

Some specimens of *A. maculipennis* were appreciably larger than others; this is ascribed to difference of nutrition in the larval stage. In Jolanda the anopheles were of small size, at Gorino larger, though of the same species. Both appeared to be equally capable as vectors, but it was noted that at Jolanda malaria was very slight. The preference of anopheles for dull and dark colours was confirmed. Of 513 *A. maculipennis* used in experiment, 20 per cent. were found on blue, 18 on dark red, 16 on reddish brown; only 0·8 per cent. on pale green, 0·4 on ochre or white, and none on yellow.

The second part of the article deals with anti-malarial measures, particularly the treatment of retting ponds with Paris green, and bonification, partial or integral. Even partial led to the reduction of endemicity and of the splenic index.

In the summary it is stated that paludism rapidly disappears from land under cultivation if water and irrigation are properly attended to and supervised ; the presence of cattle in warm stalls is an additional safeguard to man. Paris green is good, but proper bonification is better.

H. Harold Scott.

ROSSI (Giacomo). Tre anni di lotta antimalarica a Maccarese durante l'effettuazione della " Bonifica integrale." **(Three Years' Anti-malarial Campaign at Maccarese during the Execution of the Integral Bonification ("bonifica integrale").)**—*Riv. di Malariologia.* 1929. Jan.–Feb. Vol. 8. No. 1. pp. 1–27. With 5 text figs. & 8 figs. on 4 plates. [10 refs.] [English summary p. 108.]

An area of some 12,000 acres on the right of the Fiumicino Canal, in the Tiber delta, which was uncultivated and almost uninhabitable up to 1925, on account of malaria, is now being reclaimed by the Società Anonima Maccarese. An intensive anti-malaria campaign, directed by the author and conducted by a separate organization, is closely associated with the work of reclamation which includes hydraulic, agricultural, and building work. All means of control are employed, including propaganda and anti-malaria regulations. In three years the inhabitants have increased from 50 to 1,800, in addition to another 1,000 day labourers. It is claimed that there is no better example of such a complete and rapid " integral bonification " either in Central or Southern Italy.

W. F.

ROSS (Ronald). **Malaria Control through Anti-Mosquito Measures in Italy.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. June 25. Vol. 23. No. 1. pp. 107–108. [1 ref.]

In the discussion which followed a paper read by Dr. L. W. HACKETT, on February 21st, 1929, before the Royal Society of Tropical Medicine and Hygiene, Col. S. P. JAMES stated that the first practical tests of Sir Ronald Ross's method of combating malaria, which were made at Freetown and Mian Mir, early in the present century, " showed that, at any rate in those two localities, anopheles reduction . . . . . was difficult and expensive ; it could not be accomplished in those localities by the new method which Major Ross had proposed. The blow to practical anti-malarial work was a hard one." Col. JAMES also spoke of the discovery of plasmoquin and Paris green as advances towards the solution of the malaria problem. Sir Ronald Ross, in a letter to the Editor of the Transactions of the above Society, disagrees with Col. JAMES's conclusions. He points out that the work at Freetown was undertaken by Dr. Logan TAYLOR and himself as an object-lesson. It was reported on favourably, as far as it went, and was discontinued owing to opposition, lack of funds, and because the necessary object-lesson was supplied by the work of GORGAS in Havana. " There was no blow to practical anti-malarial work in this expedition of ours."

The experiment at Mian Mir, Sir Ronald considers to have been futile and proving nothing. With reference to Paris green, he points out that the cost of the actual larvicide is small when compared with the cost of administration and labour, and that it may not cost as much to distribute paraffin as to distribute Paris green. He considers that before plasmoquin can be looked upon as a sound substitute for quinine it must be shown to be not only equal in value to quinine, but its superior.

W. F.

DE BUCK (A.), SCHOUTE (E.) & SWELLENGREBEL (N. H.). Studien ueber Anophelismus ohne Malaria in der Umgebung Amsterdams. [**Anophelism sine Malaria in the Neighbourhood of Amsterdam.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Nov. 7. Vol. 109. No. 5/6. pp. 251–284. With 5 maps, 6 graphs & 3 figs. on 1 plate. [Refs. in footnotes.]

The problem attacked in this memoir is the following: A number of districts in the neighbourhood of Amsterdam all harbour anopheline mosquitoes; in some of these districts malaria is more or less frequent; in others it does not occur; can the distribution of malaria be explained by (1) biological differences of the insect porters; (2) variations of mere numbers; (3) varying access to human beings? The authors, on the basis of large samples of material analysed by biometric methods are able to establish the existence of two forms of *A. maculipennis*, characterized by morphological and biological differences. A small winged form, which does not hibernate, is specially characteristic of the malarious regions and the authors hold this to be an important factor of differentiation, but not the sole factor, for the small form does also occur in malaria-free regions. Ancillary factors are variations of gross population and of frequency of alternative hosts, e.g., presence or absence of large numbers of swine.

[The paper contains much numerical material and is of biometric importance; from the statistical point of view it would have been improved had a fuller description of the method of analysis been given; it is, for instance, not clear how the correlation between wing length and presence of a highly developed fat body has been calculated.]

M. Greenwood.

VERSLAGEN EN MEDEDEELINGEN BETREFFENDE DE VOLKSGEZONDHEID. 1929. May. 33 pp. With 1 diagram. [7 refs.]—Jaarverslag over de jaren 1927 en 1928 van de malaria-Commissie uit den Gezondheidsraad. [**Report of the Malaria Commission of the General Sanitary Council, Netherlands, on the Years 1927 and 1928.**]

This biennial report is the direct continuation of the annual reports of the Malaria Commission in the province of North-Holland for the years 1920–1926. This commission, by being incorporated in the general sanitary council, has exchanged its independence for the right to extend its activity over the whole of the kingdom.

The records on the incidence of malaria, based on the exact observations in the "selected stations," have continued without interruption. A diagram shows the rise and decline of two successive epidemics (1900–1903 and 1918–1922). In both cases the return to normal conditions has been effected without any special sanitary intervention.

This point is stressed as a reminder to the sanitarians (whose anti-larval work in Medemblik, N. Holland, in 1927 and 1928, carried out under the auspices and with the financial support of the International Health Division of the Rockefeller Foundation, is described in this paper, from unpublished reports) not to be too sure that the reduction of malaria is due to their efforts, because such reduction has been general and not limited to the areas which they have taken in hand.

Several pages are spent in discussing an opinion emitted by C. SCHILLING (based on observations collected by KORTEWEG) to the effect that new malaria epidemics are preceded by an unusually developed tendency of the pre-existing cases to relapse. It is shown that the returns in North Holland do not support this theory, when the relapses occurring during the year of the primary attack are taken separately. The statement, made in 1922 that little malaria in the autumn means little malaria in the following year, has been confirmed by additional observations.

Another aspect of the same problem, the prediction of the next epidemic, by changes occurring in the density of the anopheline population, requires the unfailing care of the commission. Regular counts in various resting places of anopheles in the neighbourhood of Amsterdam have been made since 1920 and are gradually being extended to other parts of the province. But will the commission succeed in inducing the sanitary authorities to keep their interest in malaria awake till the rise of the next epidemic, which can hardly be expected before 1938 ? This is doubtful considering the comparatively heavy expenses incurred.

Short accounts of investigations concerning the influence of land reclamation on the anopheline population, and an inquiry into the phenomenon of " anophelism without malaria " in the Netherlands, occupy the remainder of this report, which, beside much which is of local interest only, touches upon certain points which command a wider attention.

N. H. Swellengrebel.

SCHILLING (Claus). Zur Epidemiologie der Malaria. (Nachtrag zu der Abhandlung gleichen Titels in Bd. 110, S.120.) [**Epidemiology of Malaria ; Supplement to Previous Paper in Vol. 110, p. 120.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1929. July 24. Vol. 110. No. 2. pp. 427–428. With 1 text fig. [Robert Koch Inst., Berlin.]

A curve is given showing the total fresh infections from malaria in Wormerveer, Holland, from 1903–1918. In 1904 the fresh infections showed a marked tendency to relapse ; in 1905 the number of fresh infections increased considerably. In 1905–1906 the fresh infections showed a slight tendency to relapse, or, expressed otherwise, the action of quinine on the fresh infections was better. In the two following years the curve of fresh infections fell steeply. In 1916 there was a definite increase of the relapse cases, indicating a strong quinine resistance. Unfortunately, owing to the departure of the Medical Officer the number of relapses and fresh infections for years 1917 and 1918 could not be ascertained. It is considered that the observations support the belief that the tendency to relapse, or resistance to quinine, plays a part in the production of malaria epidemics. Further observations on these lines are required. From the details at his disposal, the author is not

able to find support for his view that a relative increase of the percentage of relapses in a given year enables a conclusion to be drawn as to the malarial morbidity in the following year. He thinks that a thorough investigation of this very important practical point would be profitable.

E. D. W. Greig.

GUELMINO (D.). Beitrag zur Epidemiologie der Malaria in Mazedonien. [**Epidemiology of Malaria in Macedonia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Aug. Vol. 33. No. 8. pp. 423–430. With 2 text figs.

In Macedonia there is a certain degree of parallelism between the activity of anopheles and the variations in benign tertian malaria. The question arose whether this connexion was accidental or cause and effect. The investigation was undertaken to settle this point, and at the same time to throw light on the occurrence of fresh infections and relapses in the various periods of the year. Malaria in Macedonia has a seasonal character. It begins with the appearance of new anopheles, and ends with the cessation of their activity. The charts show that the curve of malaria begins to rise in the month of April, falls slightly in June and again rises reaching its peak in September. It falls steeply in October, and reaches its starting point in the following months. The off-season of benign tertian malaria lasts from November to April and during this period the mosquitoes hibernate. Winter infection is extremely rare. The mosquitoes are *Anopheles maculipennis* and *superpictus*. The conditions in the warm spring months in Macedonia are extremely favourable for the development of *P. vivax* in the mosquito. The spring epidemic of benign tertian malaria is mainly due to fresh infections, not to relapses of old cases, as some hold. The course of malaria is dependent on the biology of the anopheles. Although the anopheles diminish towards the end of May, those that remain are much more heavily infected, as the sexual forms of the parasites have become much more numerous in the blood of patients. This explains the rise of the malarial curve in July. In August and September new generations of *superpictus* arise and in these months the maximum of anophelism is reached, so the curve continues to rise. In October *maculipennis* and *superpictus* begin to hibernate. Malignant tertian malaria begins in epidemic form towards the end of summer (July) and lasts till the end of October. This summer-autumn epidemic is chiefly due to fresh infections and the cause of the late appearance is the unfavourable temperature conditions for the mosquito infection with *P. falciparum*. It is considered that both *maculipennis* and *superpictus* take part in the transmission of *Plasmodium falciparum* in Macedonia.

E. D. W. Greig.

PITTALUGA, MARTINEZ CEPA, TORRIJOS & GINÉS. Estudios sobre el paludismo en Aragón. Estudio de la estanca de Alcañiz. [**Malaria Research in Aragon. A Study of the Estanca de Alcaniz.**]—*Medicina Países Cálidos.* Madrid. 1929. May. Vol. 2. No. 3. pp. 225–250. With 19 text figs. French summary p. 249.

Under the direction of Professor Pittaluga, Dr. Cepa, Dr. Torrijos and Dr. Ginés have studied the conditions of endemic malaria and

anophelism in the neighbourhood of Estanca de Alcañiz, a natural lake 6 kilometres in circumference. It is 8 metres deep in the middle and shallow at the edge, covered with weeds and full of the larvae of *A. maculipennis.* In spite of this, there is very little malaria among the inhabitants of the houses near the lake, and this study, which will be continued throughout 1929, was undertaken to determine the reason for the low rate of infection. A detailed examination of domestic animals was made with reference to the number of anophelines caught in the houses.

The summary gives no information about the conclusions reached.

W. F.

MUFFEL (P. P.). Beobachtungen ueber die tropische Malaria in der Stadt Woronesh (1924–1928). [**Malaria in Voronezh Town, Russia, 1924-1928.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. July. Vol. 33. No. 7. pp. 393–397. [5 refs.]

Observations were made at two malarial stations in the town of Voronezh, which is situated in Soviet Russia in Europe, towards the south-east. It is the capital of a Government of that name. The material was abundant. From April 1st, 1924, to April 1st, 1928, there were 18,407 first visits and 138,021 subsequent visits to the malarial stations. There were 2,120 cases of malignant tertian malaria. It occurred at all ages. The peak of malignant tertian malaria was reached in 1926 when there were 786 cases. In 1927 it fell to 368, and, in the first three months of 1928, there were only 13 cases. This marked fall is attributed chiefly to peculiar meteorological conditions of the last two years. Most cases relapsed. 474, 34 per cent., of malignant tertian cases were mixed infections. In 136, 28 per cent., *Plasmodium vivax* and *P. falciparum* were found simultaneously. Much more frequently, however, 71·3 per cent., *P. vivax* was found before or after *P. falciparum.* Malignant tertian malaria shows two peaks in the year; a slight one in the beginning of the year, and a marked one in autumn, August and September, primary infections occurring in August and relapses in September. The results are set forth in 5 tables.

E. D. W. Greig.

BOGOYAVLENSKY (N. A.). [**Endemic Malaria and Physical Conditions of the Population.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 10. pp. 639–643. [In Russian.] [From abstract furnished by Dr. N. A. Bogoyavlensky.]

In the low-lying riverine part of Azerbaijan the spleen index is 87 and Ross's 5·3; in the mountains 17·1 and 1·6, and in intermediate irrigated parts 81·1 and 7·8. The mountain zone furnishes 3½ times as many acceptable recruits as the riverine; 8·7 per cent. of those from the first and 75·4 from the second require rejection.

Clayton Lane.

SOUTHERN MEDICAL JOURNAL. 1929. Apr. Vol. 22. No. 4. pp. 357–411. With 6 maps, 1 chart & 1 graph. [36 refs.]—**Symposium on Malaria.** [UNDERWOOD (Felix J.), KRAUSS (William), MURPHEY (E. E.), HACKETT (L. W.), HOFFMANN (Frederick L.), LEPRINCE (J. A.) & JOHNSON (H. A.), GRIFFITTS (T. H. D.), CARLEY (Paul S.) & BALFOUR (Marshall C.), MELENEY (Henry E.), BISHOP (Eugene L.) & ROBERTS (Frank L.), FULLERTON (H. R.), CLARKSON (L. M.), GILL (D. G.), KIKER (C. C.) & SIMS (L. C.), BAIR (M. Z.), FILBY (E. L.), ABERCROMBIE (T. F.), MCCORMACK (A. T.), DOWLING (Oscar), PETTY (W. S.), LAUGHINGHOUSE (Chas. O'H.), HAMILTON (R. G.), GRANT (H. G.).]

The summer of 1926 saw the end of a steady and long continued decrease in the malaria-rate of the Southern States. There was a large increase in 1928, the type of malaria became more severe and several cases of blackwater fever occurred. At the 22nd Annual Meeting of the Southern Medical Association held at Asheville, North Carolina, in November, 1928, a meeting was held conjointly with the National Malaria Committee, at which a number of papers was read dealing with problems in malaria.

(1) The Chairman, Dr. F. J. Underwood, urged that every effort should be made to establish a full-time County Health Department in each county of every State in the Union, and that under this Department should come the handling of every health problem including malaria.

(2) Dr. Wm. Krauss, Professor of Tropical Medicine in the University of Tennessee, read a paper on the subject of plasmoquin. He found that 0·1 gram, given daily in five separate doses, was an excessive amount to use in general practice. He emphasized the efficacy of plasmoquin in benign tertian malaria and crescent cases, but stated that it "cannot and must not be relied upon in aestivo-autumnal malaria. Persistence in experimenting with plasmoquin in aestivo-autumnal malaria," he said, "will result in serious disappointment and possibly some deaths from pernicious malaria. If crescents are present it should be given in conjunction with quinine."

(3) Dr. E. E. Murphey of Georgia University recommended intravenous injections of sodium cacodylate in the treatment of malarial coma and other very severe forms of the disease. The drug was obtained in sterile ampoules, and a total of 20 to 30 grains was given in four doses within each 24 hours. As soon as possible the arsenic was discontinued and quinine was given. In a series of experimental cases in which the drug was continued and no quinine was given, the parasites disappeared and the patients were cured. In the discussion which followed Dr. Murphy's paper, Dr. Krauss stated that he still held with other malaria workers that the arsenicals, including sodium cacodylate, were vastly inferior to quinine, and that he did not feel that it would be safe to employ the large doses used by Dr. Murphy.

(4) Dr. L. W. Hackett, of the Rockefeller Foundation, in a most interesting paper on the habits of Anophelines which transmit malaria in America, in Europe, and in the Far East, pointed out the danger of drawing general conclusions from experience of malaria control gained in limited areas, and the many failures which have followed attempts to apply methods, which have been successful in one place, to the control of malaria in another area, without first studying the local mosquitoes and their habits. He gave the following examples of the

differences in the habits of mosquitoes in different places and their bearing on methods of control. In the Malay States, for instance, *A. umbrosus*, the carrier in the flat coastal plains, is a shade-loving mosquito, and clearing the jungle banishes malaria. Farther inland, the carrier is *A. maculatus* which breeds in unshaded running water, and here, clearing the jungle brings malaria. Again, in the Philippines, on the basis of experience in America, barracks for the American troops were built in the hills, away from the coastal plains and swamps. Subsequent experience showed that this hilly country was the most malarious part of the Island, because *A. minimus*, the local carrier, breeds only in the hill streams, and nowhere in the plains.

Malaria has disappeared spontaneously from some parts of Europe, and the theory has been advanced that it vanishes in the presence of intensive cultivation and improved standards of living. Dr. HACKETT said that this generalization cannot be applied to the tropics; spontaneous disappearance of malaria is never seen there, and "anophelism without malaria" is linked up with the food habits of the European anopheline, *A. maculipennis*, which in certain regions no longer bites man. He drew attention to the importance which some malariologists attach to the killing of mosquitoes in houses, on the ground that infected mosquitoes remain in the houses where they have fed. This theory, he said, is not of general application; even if it may be true in some places, it does not apply in the Far East, where *A. culicifacies*, the Ceylon carrier, *A. maculatus*, the Malayan carrier, and *A. minimus*, the Philippine carrier, leave the houses as soon as they have fed.

Dr. Hackett drew attention to the question why some species of anophelines are carriers and others are not, and to the yet more puzzling question why a given species is a carrier in one place and not in another. For instance, WINOTO found *A. aconitus* infected in Western Java, to the extent of 7 per cent., while SWELLENGREBEL, in the same year, found none infected in Sumatra. *A. ludlowi* is another mosquito which carries malaria in one region and is harmless in another: in the mangrove swamps of Batavia and Singapore, it is a dangerous carrier; in the fish ponds of Manilla, it is perfectly harmless. Dr. Hackett believes that these differences are explained by the different habits of the anophelines in different places: in one they are man-eaters, in another they are not. Thus, with regard to *A. maculipennis*: on the Tiber delta, one mosquito in four was caught in bedrooms, but, in Massarosa (Tuscany), where malaria is very uncommon, the anophelines were plentiful, but only one in 400 had bitten man, as shown by the precipitin reaction of the ingested blood.

(5) Messrs. J. A. LePrince and H. A. Johnson, Sanitary Engineers, of the U.S. Public Health Service, described a method of distributing Paris green from a small skiff, fitted with an out-board motor, by means of a blowing equipment consisting of a 600 watt petrol engine-generator unit and a 100 watt electric-driven blower. This apparatus distributed 5 to 15 per cent. Paris green, mixed with hydrated lime, as the boat moved along. The time of application was five minutes an acre, and half a pound of Paris green per acre was found sufficient. They drew attention to the numerous unsatisfactory and inert samples of Paris green which are on the market.

(6) Dr. Gill of the Alabama State Board of Health, stated that each lot of Paris green should be examined to ascertain if it contained the required minimum of 50 per cent. of arsenious oxide, and that its toxicity for larvae should be tested both in the pan and in an experi-

mental area. He also recommended that it should be fine enough to pass through a 300-mesh sieve. He had not found Paris green equally effective on all breeding grounds, it worked best where weeds were present. He had found kaolin, soapstone, and lime equally suitable as diluents.

(7) Drs. H. E. Meleney, E. L. Bishop, and F. L. Roberts, read a paper on the malaria problem of the 453 square miles of Tennessee which are subject to flooding by the Mississippi, the entire area of which is suitable for the breeding of *A. quadrimaculatus*. They considered most of the breeding grounds too extensive and inaccessible for the use of larvicides. "Air-plane dusting with Paris green is, of course, far too expensive for use over this large area," and the authors consider that "country-wide screening may bring a greater amount of immediate relief than any other anti-malarial measure." Detailed estimates of the cost of screen doors and screen-windows were given by Mr. H. R. Fullerton.

W. F.

BARBER (M. A.), KOMP (W. H. W.) & KING (C. H.). **Malaria and the Malaria Danger in Certain Irrigated Regions of Southwestern United States.**—*Public Health Rep.* 1929. May 31. Vol. 44. No. 22. pp. 1300–1315. [3 refs.]

Many thousands of acres have been reclaimed by irrigation in the arid regions of the South-Western United States. The climate is warm, and the water brought in by irrigation often becomes highly productive of anopheline mosquitoes. The authors did most of their work in the Rio Grande valley of New Mexico and Texas, the Pecos Valley of New Mexico, the Salt River Valley of Arizona, and the Imperial Valley of California. In the localities surveyed, malaria seems to be largely confined to the Rio Grande Valley of Texas and New Mexico. *A. pseudopunctipennis* was found in both localities, and *A. maculipennis* was present in addition in New Mexico. The prevailing type of malaria is benign tertian. The authors recognise that it is neither necessary nor practicable to carry out expensive anti-mosquito operations throughout the Rio Grande Valley; but as malaria has become a serious problem in at least one locality where it was not known before 1905, they recommend the following measures: early recognition and treatment of cases, education, anti-larval measures in populous centres where the malaria rate is high. They have found Paris green and Gambusia most useful in these regions.

W. F.

HILL (Rolla B.). El paludismo en Venezuela. [**Paludism in Venezuela.**]—*Gac. Med. de Caracas.* 1928. Dec. 15. Vol. 35. No. 23. pp. 353–359. [3 refs.]

Investigations have been made by the Health Department of Venezuela with the aid of the Rockefeller Foundation into (1) malarial prevalence in Venezuela; (2) hookworm; (3) the malarial problem in Maracay. The first only is dealt with in the present article. In some parts, Mérida, Trujillo, Falcón, and Nueva Esparta, mortality from malaria is very low, but in Anzoátegui, Carabobo, Portuguesa, Cojedes

and Zamora very high. Blood was examined from 1,941 individuals and spleen measurements in 3,515. Of the bloods examined 488 (16·5 per cent.) contained parasites, 330 *P. vivax*, 123 *P. falciparum*, 19 *P. malariae.* and 16 mixed. In Los Llanos 38 per cent. of the bloods were positive and the splenic index for the whole region 69 per cent. ; Palenque was the most infected district, the figures being 70 per cent. of blood infections and 99 per cent. with splenic enlargement.

Sixteen or seventeen species of Anopheles have been identified in Venezuela, of which *A. albimanus* is the chief, some maintain the sole, transmitter of malaria.*

H. Harold Scott.

WILSON (P. W.). **Report of Malaria and Microfilaria Survey of 11,000 Laborers and 2,007 Children in Haiti.**—*U.S. Nav. Med. Bull.* 1929. Jan. Vol. 27. No. 1. pp. 87–93.

11,000 men desiring to ship from Port de Paix, Haiti, for the Cuban cane fields were medically examined generally, and also specially for enlarged spleen, haemoglobin, plasmodia and microfilariae. Every man was photographed, vaccinated, given 1 cc. of oil of chenopodium from which only one man suffered ill effects ; he had walked for two days almost starving, and recovered as the routine purge of 60 cc. of a saturated solution of magnesium sulphate began to work. Quinine was given to all with malaria parasites. In seven cases plasmochin compound was given in daily dose of 0·04 gm. plasmochin and 0·6 gm. quinine. In one of the seven, after 6 days treatment, there appeared gastric pain, dizziness, vomiting, pallor, jaundice, basophilia, and leucocytosis of 20,000, to 25,000. He recovered.

C. L.

KLIGLER (I. J.) & REITLER (R.). **Studies in Malaria. IV.—Prophylactic Use of Plasmochin in a Bedouin Population.**—*Riv. di Malariologia.* 1929. Jan.–Feb. Vol. 8. No. 1. pp. 28–33. [Malaria Research Station, Hebrew Univ., Jerusalem, Palestine.]

The authors' purpose was to administer plasmoquin compound, daily for one week, to a group of highly infected Bedouins who live on the outskirts of the Jewish colony established at Hedera. They intended to repeat the treatment whenever fresh gametocytes appeared, until they had determined the minimum period of treatment which would give the maximum period of freedom. This procedure was to be carried out during the active anopheline season, and its effect on the course of malaria in the untreated Hedera population was to be noted.

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* In connexion with this work of Dr. Rolla Hill attention should be called to the summary of a paper by Dr. BENARROCH on Studies on Malaria in Venezuela (*ante*, p. 366). In this a list is given of 16 species of Anopheles captured, of which six were so scarce as to warrant exclusion as vectors of the disease. The remaining ten (which were named in the abstract) were not naturally infected, as was erroneously stated, but were regarded as "probable vectors." Natural infection was exceedingly rare. None was found among 721 mosquitoes dissected by Dr. BENARROCH in 1927, but in the following year two specmens of *A. albimanus* revealed oocysts in the stomach.

The plan was excellent, but the Bedouins did not like it; before many days had elapsed they refused to take the plasmoquin and few of them took it for more than three days. The authors attribute this to a provocative effect of the drug upon latent infections. "A case of haemoglobinuria made it advisable to interrupt the work in this region," and the blood was examined after treatment in only 19 cases. The authors consider the results encouraging, but the treatment was followed in many instances by clinical attacks of malaria, sometimes with serious effects in malignant tertian infections. In addition to the case of haemoglobinuria, three others showed definite icterus; consequently, the authors conclude that great caution should be observed in administering the drug *en masse*, and "the work should be carried out only under the constant supervision and control of a physician."

W. F.

Ottolenghi (D.) & Brotzu (G.). El tratamiento preventivo con quinina y con otros medicamentos como medio profilactico en el paludismo experimental. [**The Prophylactic Use of Quinine and other Drugs in Experimental Malaria.**]—*Medicina Países Cálidos.* Madrid. 1929. May. Vol. 2. No. 3. pp. 221–224. [Hyg. Inst., Univ., Bologna.]

The authors studied the question of quinine prophylaxis in experimental malaria with a view to its application as an antimalarial measure. The problems they put forward were: (1) Will an individual who has been treated with quinine in small doses daily, or a larger dose twice a week, become infected if subjected to the bites of infective anopheles? (2) After the mosquitoes have been allowed to bite, if the quinine is suspended at different intervals, when will the attack occur?

The experiment was arranged thus: One group of subjects, with mental disease, but in good general health and no malarial history, was given 40 cgm. of bisulphate daily for ten days, 20 cgm. morning and evening. On the third day they were subjected to the bite of an infected anopheles (proved by their being allowed to bite unprotected individuals and subsequently by dissection to demonstrate sporozoites in the salivary glands). A second group received 1 gm. of the bisulphate twice a week, 50 cgm. twice on each day of treatment. In this group infection was allowed one day or five days before starting quininization, with a view to determining the abortive value of this bi-weekly method.

Other tests were made using plasmochin and plasmochin compound. The results of the few experiments made show that the sporozoites were not destroyed by the quinine given either before or immediately after inoculation; also that the infection might remain latent while the treatment continued, but that when this was suspended attacks occurred typically at the end of the usual period of incubation or soon after, and that a single infected mosquito could transmit infection. Delay was in some cases greater when plasmochin was employed.

Further investigations are to be undertaken to determine the effect of more prolonged treatment on latent malaria and the effects of repeated infection during the period of quininization.

H. Harold Scott.

REED (Alfred C.). **Malaria—a Practical Review.**—*California & Western Med.* 1929. Apr. Vol. 30. No. 4. pp. 217–220. [Pacific Inst. of Trop. Med., Univ. of California, Berkeley.]

In concluding his review of malaria, Dr. Reed expresses the opinion that mosquito control should be followed as a local measure until better weapons are available; but "a geographical survey of the tropical world shows at once its difficulties and the small impression on the total problem so far accomplished by it . . . . . .

"The larger problem of the eradication of malaria as a foe of human kind lies beyond the horizon, by this method. If plasmoquin compound or an analogous drug proves as effective on wholesale use as it does now on a smaller scale, we may well have in it the means for a really effective attack on the existence of malaria."

W. F.

WISCHNEVSKY (N. C.). [Quelques observations sur le tableau parasitaire et la formule leucocytaire dans la fièvre quarte pendant la quinisation.] [**Observations on the Parasite Picture and Leucocyte Formula in Quartan Fever during Quinine Treatment.**]—*Russian Jl. Trop. Med.* 1929. Vol. 7. No. 2. pp. 87–92. [5 refs.] [In Russian. French summary pp. 92–93.]

The author reached the following conclusion as the result of the examination of 15 cases. (1) The schizonts of *P. malariae* disappear from the peripheral blood in three or four days under systematic quinine treatment. The gametocytes disappear in eight to eleven days. (2) Before treatment there is generally a leucopenia. The neutrophiles are decreased (800 to 2,500 per cmm.). The lymphocytes are also decreased (786 to 1,646 per cmm.), and so are the eosinophiles, to such an extent that it may be impossible to find any. The mononuclears are relatively increased, though their actual numbers remain within normal limits (201 to 356 per cmm.). (3) During treatment and after the disappearance of the parasite, the number of white cells (neutrophiles, lymphocytes, and eosinophiles) increases. The mononuclears diminish in some cases, but in others they show a remarkable increase.

W. F.

ROSS (Ronald). **Malaria and Feeding.** [Correspondence.]—*Jl. Trop. Med. & Hyg.* 1929. May 1. Vol. 32. No. 9. p. 132.

Sir Ronald Ross draws attention to "an absurd notion which has been ventilated in the lay press to the effect that the way to prevent malaria fever is to feed the native more copiously," and such a notion will certainly do harm should it encourage administrators and employers of labour to think that nothing else is necessary. [At the same time, it is amongst ill-fed populations that malaria is seen at its worst, and is most likely to appear in epidemic form. A country with a starving population can do little to combat malaria.]

W. F.

KARVE (D. S.). **Malaria in Pregnancy and Labour.**—*Kenya & East African Med. Jl.* 1929. May. Vol. 6. No. 2. pp. 43–49. [7 refs.]

This paper gives a good account of the deadly effect of malignant tertian malaria in pregnancy. Dr. Karve's experience was gained

among the immigrant Indian women in Nairobi. He finds that benign tertian malaria causes little trouble, but the sub-tertian type is responsible for abortion, haemorrhage and death. In 32 cases, attended by him during the first six months of pregnancy, 4 of the mothers died, there were 24 abortions, 4 cases of ante-partum haemorrhage, 2 still births, and only 2 natural births. Even the prompt administration of quinine availed but little. Malaria during the last three months of pregnancy proved less disastrous; there were only 3 abortions in 21 cases, and 18 went to full term.

The interesting statement is made in this paper that malaria was rare in Nairobi until 1925, and the first serious epidemic occurred in 1926.

W. F.

NAZARIO (R. C. Ruiz). **Coincidence of Malaria and Typhoid Fever.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1929. Feb. Vol. 4. No. 8. pp. 365–369.

Owing to lack of agreement as to the frequency of the association of malaria and typhoid fever, Dr. Nazario undertook the investigation of this question in Porto Rico, where epidemics of typhoid occur in malarious districts. Laboratory data were obtained of 63 cases of typhoid which occurred during such an epidemic, and the record showed that malaria parasites were found in 11 of them. Judging from this, and from the result of inquiries made among medical practitioners in Porto Rico, and also from his own experience of cases seen in consultation with them, Dr. Nazario, so far from finding himself in agreement with CRAIG (who considered that there was a certain amount of incompatibility between typhoid and malaria which caused the symptoms and the parasites of the latter to disappear during the febrile stage) came to the following conclusions: it is not unusual to find coincident infection by typhoid fever and malaria; typhoid is more frequent in localities where malaria is endemic and the symptoms are more severe when it is complicated by malaria.

W. F.

ZALLOCCO (A.). Poliurie ed albuminurie nella malaria della infanzia. [**Polyuria and Albuminuria in Malaria in Children.**]—*Pediatria.* 1929. June 15. Vol. 37. No. 12. pp. 647–654. [Inst. Clin. Pediatrics, Univ., Rome.]

REM-PICCI divides cases of malarial albuminuria into three categories: the febrile when this symptom occurs during or immediately following the attack; post-malarial when it follows some time after; and cachectic, in malarial patients without fever. Children differ from adults in these respects. 100 children were examined and in 12 only was polyuria present, whereas in adults it commonly accompanies the cold stage. Albuminuria, on the other hand, was noted in 26 children after the febrile attacks had ceased or who were in a cachectic state; this is less often found in adults. The quantity of albumen was practically twice as great in the subtertian infection as in the benign.

H. Harold Scott.

ZALLOCCO (A.). Le convulsioni nella malaria dei bambini. [**Convulsions in Malaria in Children.**]—*Pediatria.* 1929. July 15. Vol. 37. No. 14. pp. 739–746. [Inst. Clin. Pediatrics, Univ., Rome.]

In many children of tender age convulsive attacks occur in malaria, particularly those of syphilitics, alcoholics, epileptics, and neurasthenics. They may occur at the beginning of the chill, or replacing it, or after a slight chill and during the fever, and in " malarial meningeal states." The cerebrospinal fluid in the last may be clear, but under increased pressure, without lymphocytosis, but with increased albumen ; in other cases the leucocytes may be in marked excess, the fluid may be turbid, and there may even be a polynucleosis leading to a suspicion, if not actual diagnosis, of cerebrospinal fever, but bacteriological examination is negative.

H. Harold Scott.

ZALLOCCO (A.). I disturbi del ritmo cardiaco nella malaria dei bambini. [**Disturbances of Cardiac Rhythm in Malaria in Children.**]—*Pediatria.* 1929. Apr. 15. Vol. 37. No. 8. pp. 428–437. [Inst. Clin. Pediatrics, Univ., Rome.]

Arrhythmia has repeatedly been observed in adults suffering from malaria ; it may assume a bradycardia or tachycardia, as, for example, in a case recorded by VITELLO where a woman of 46 years had a pulse of 75 per minute when the temperature was 39° C., but only 40–45 during the pyrexial attacks. The author now calls attention to similar disturbances in children. In those with vomiting, the change of rhythm may be due to vagus inhibition ; some, however, show marked tachycardia, 120–140 beats per minute, without any apparent distress. In others the pulse is slow and this is thought to be due to toxins acting on the bundle of His.

H. Harold Scott.

AKOWBJANZ (G.). [Lésions rénales de l'origine paludéene.] [**Lesions of the Kidneys due to Malaria.**]—*Acta Univ. Asiae Mediae.* Tashkent. 1928. Ser. 9. Med. No. 1. pp. 1–12. [In Russian. French summary p. 13.]

The author points out that malaria, like other infectious diseases, may cause damage to the kidney ; which, though primarily of a degenerative character (a nephrosis) is often accompanied by acute and chronic inflammatory changes. He draws attention to the importance, under the conditions of life in Turkestan, of examining every case of renal disease for malaria, and states that quinine often has a marvellous effect in those which are due to it, particularly in the acute and sub-acute stages.

W. F.

PHOTAKIS (B. A.). Veränderungen der Milz bei Malaria. [**Alterations of the Spleen in Malaria.**]—*Virchows Arch. f. Path. Anat.* 1929. Feb. 16. Vol. 271. No. 1. pp. 194–196. [4 refs.] [Univ. Municipal Clinic, Athens.]

This is an investigation of the spleens of persons who have died of acute and chronic malaria . The newly formed cells of the spleen indicate the stage of the disease and the clinical form. Thus, if the cell increase

is exclusively of endothelial cells of the blood sinuses, then it is a hyperacute, malignant, fatal form; if of reticular tissue of the red pulp of the spleen, then it is an acute variety; if it is only of interstitial connective tissue, then it is a chronic form. In the hyperacute condition the growth of the R.E. cells causes an increase of the phagocytosis and deposit of iron.

E. D. W. Greig.

WOLSKI (M. E.) & SCHEWELEWA (E. M.). Zur Frage der Bilirubinämie bei Malaria. [**Bilirubinaemia in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Apr. Vol. 33. No. 4. pp. 210–215. [17 refs.]

In acute febrile malaria, where diagnosis is almost always in little doubt, the bilirubin content of the blood is raised; in chronic cases, where doubt may exist, it is not higher than normal. It has no relation to the species of plasmodium, the degree of infection or the size of the spleen.

C. L.

NAVARRO (Antonio) & SPANGENBERG (Jacobo J.). Asma palúdica. Una observación clinica y algunos comentarios. [**Malarial Asthma.**]—*Semana Méd.* 1929. May 2. Vol. 36. No. 18 (1842). pp. 1111–1114. [8 refs.]

The patient, a man of 43 years, had suffered for five years from "bronchitic and suffocative attacks," which became more frequent till during the last year they recurred daily towards noon and were very severe. Scanty malarial parasites were found in the blood and quinine was given. After three days the attacks diminished in severity and after a week they disappeared altogether. The author concludes that malaria may manifest itself with anaphylactic phenomena, urticaria, paroxysmal haemoglobinuria, asthma, and suchlike.

H. Harold Scott.

BONNE (C.) & ROSKOTT (E. R. A. Luyke). Een geval van Malaria haemorrhagica. [**Case of Haemorrhagic Malaria.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Feb. 20. Vol. 69. No. 2. pp. 170–176. With 1 plate. [8 refs.]

A case of subtertian malaria in a Chinese, who died a few hours after admission to the hospital. He showed haematemesis, serious melaena and several haemorrhagic patches in the skin. The post-mortem examination revealed no cause for the haemorrhagic condition, but the malaria infection itself. Microscopic examination of the mucous membrane of the gut showed that the capillaries were crammed with parasites. Contrary to what is regularly found in comatose malaria only few parasites were found in the capillaries of the brain. The haemorrhagic type of malaria is to be distinguished from dysenteric malaria, the existence of which type is maintained by many authors, denied by others.

W. J. Bais.

NETTER (L.). Un cas de paludisme accidentel. [**A Case of Accidental Malaria.**]—*Bull. Soc. Path. Exot.* 1929. May 8. Vol. 22. No. 5. pp. 318–319.

Dr. Netter reports the case of a young woman, recovering from an operation in Paris, who consented to be a donor of blood to a man in the

same hospital who had been invalided from one of the French Colonies. The transfusion was performed with a Jubé syringe. Eleven days later the woman had an attack of benign tertian malaria. She had never been to the Colonies herself, nor had she ever suffered from any illness apart from that which made her operation (hysterectomy) necessary.

W. F.

DSCHAPARIDSE (P.). [Zur Frage der Artenimmunität bei Malaria.] [**Species Immunity in Malaria.**]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1929. Mar. Vol. 2. No. 3. [In Georgian script. German summary pp. 260–261.]

The investigations of the author in the districts of high endemicity, Gali and Gudauti (Georgia), are communicated. He concludes that a relative malarial immunity can develop in the endemic area, if it has been populated for a considerable time, if no fresh arrivals are added to the population, and, also, if there is not a floating population. He considers that the relative immunity is strongly specific for each species of the malarial parasite. The immunity produced by *Plasmodium vivax* lasts longest and is the strongest; whilst that produced by *P. falciparum* is much weaker, if any is produced at all. He had very little material to settle the question of the immunity produced by *Plasmodium malariae*, but he thinks it occupies an intermediate position between the other two species in this respect. Therefore, in discussing malarial immunity one must always refer to the species of parasite.

E. D. W. Greig.

SOESILO (R.). **The Experimental Susceptibility of** *M. rossi* **for Malarial Infections.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1928. Vol. 17. Pt. 4. pp. 509–514. [10 refs.] [Med. Lab., Weltevreden.]

Soesilo shortly reviews the literature dealing with the very varying reports of natural infection of *A. subpictus* with malaria. He recalls the finding of WALCH & SARDJITO [*Geneesk. Tijdschr. v. Nederl-Indië*, 1928, Vol. 68, p. 247.] that this mosquito is with reluctance anthropophagous. He shows that whether the larvae have lived in fresh or salt water the infection to experimental feeding has not been less than 80 per cent., and concludes that the degree to which the mosquito is found infected in nature is a measure not of susceptibility to infection but of preponderating zoophily.

C. L.

i. CIUCA (M.), BALLIF (L.) & VIERU (M.). Sur la biologie de l'hématozoaire de Laveran dans l'infection expérimentale par le sang virulent. [**Biology of Plasmodium in Infection with Virulent Blood.**]—*C.R. Soc. Biol.* 1929. Mar. 1. Vol. 100. No. 8. pp. 573–575.

ii. ——, —— & ——. Evolution des formes sexuées dans l'infection malarique expérimentale par transfusion de sang virulent.—*Ibid.* pp. 576–577. [1 ref.]

i. "Experimental" infection means here that there was injection by syringe of malarial blood. Of 26 tertian cases, schizonts and gametocytes appeared simultaneously in 19, gametocytes followed

schizonts within 5 days in 5, and preceded them by 3 days in 1. In 37 quartan cases gametes and schizonts appeared simultaneously, as also in 6 of 20 subtertian cases.

ii. It is believed that the gametocytes were already being formed in the blood of the donor.

C. L.

SORGE (Giuseppe). Ricerche parassitologiche comparative fra sangue periferico e midollo osseo in malarici. [**Examination for Parasites in the Peripheral Blood and Bone-Marrow in Malaria.**]—*Riforma Med.* 1929. July 29. Vol. 45. No. 26. pp. 872–873. [Med. Clinic, Univ., Catania.]

Nine patients were observed. Blood-smears and smears of marrow withdrawn from the sternum at the same time were examined. In five of them no parasites were found, even after prolonged search. They had been seen previously in the peripheral blood and quinine had been given. In two of the remaining four they were numerous in the blood, three or four in each field, while in the marrow, though present, they were very few, one or two in a smear. In the other two they were found in the blood, but were absent from the marrow. Hence, it is concluded that examination of marrow from the sternum is not a useful method of diagnosis. If found at all, the parasites are in smaller numbers (segmenting forms or gametes) than in the peripheral blood.

H. Harold Scott.

SINTON (J. A.) & BIRD (W.). **Studies in Malaria, with Special Reference to Treatment. Part XI. The Cinchona Alkaloids in the Treatment of Benign Tertian Malaria.**—*Indian Jl. Med. Res.* 1929. Jan. Vol. 16. No. 3. pp. 725–746. [23 refs.] [Malaria Treatment Centre, Malaria Survey of India, Kasauli.]

This paper summarizes the result of the treatment of over 1,300 cases of benign tertian malaria during five years, the patients being subsequently examined microscopically for 8 weeks. Fresh infections relapse less frequently after treatment than do chronic ones and in them the quinine and alkali course seems more efficacious than quinine alone. For chronic infections this last does not hold, and for them the following average relapse rates were obtained. For quinine (667 cases) 68, quinidine (208) 83, cinchonine (72) 67·6, cinchonidine (107) 68·7, cinchona febrifuge (110) 73·1. Apart then from quinidine the other crystalline alkaloids and their combination as cinchona febrifuge were equally effective, a confirmation of the great economic importance of this cheaply prepared preparation.

C. L.

HOCKETT (A. J.). **The Effect of Alkalis upon the Solubility of Quinine Salts.**—*Proc. Soc. Experim. Biol. & Med.* 1929. Apr. Vol. 26. No. 7. pp. 613–614. [4 refs.] [Med. School, Univ. of Oregon, Portland.]

The author sought to determine the solubility of quinine hydrochloride, bihydrochloride, and bisulphate in solution of alkaline salts at various concentrations and pH, when equal parts of a 2 per cent.

quinine salt and an alkaline salt were mixed. It was assumed that the concentration of quinine in the stomach and duodenum, after a therapeutic dose, was approximately 1 per cent. The pH values of the average precipitation points were as follows: quinine hydrochloride 7·19, bihydrochloride 3·62, bisulphate 3·46. These are almost in the same relation as the pH values of their 2 per cent. aqueous solutions, which are, respectively, 6·1, 2·6 and 2·4. These figures are said to lie within the pH ranges of the human stomach and duodenum. The author concludes that the results "seem to justify the statement that physiological concentrations of alkalis definitely alter the solubility of amounts of quinine salts corresponding to the full therapeutic dose as found in the upper gastro-intestinal tract."

W. F.

LEGA (G.). Il chineto, la cinconina, la chinidina nella cura della malaria. (**Quinetum, Cinchonine and Quinidine in Malaria Treatment.**)—*Riv. di Malariologia.* 1928. Sept.–Oct. Vol. 7. No. 5. pp. 629–658. With 10 graphs in text. [34 refs.] [English summary pp. 843–844.] [R. Inst. of Clin. Med., Rome.]

This paper concerns the results of the comparative treatment of 140 patients with cinchonine, quinidine, and two kinds of Government-manufactured quinetum which contain quinine, cinchonidine and cinchonine. Quinetum showed itself almost as efficacious as quinine, and quinidine proved even better, but the results with cinchonine were not in accord with those of recent English workers, for it proved of little therapeutic value.

W. F.

FREIMAN (Mark). **Plasmoquine and Plasmoquine Compound in Treatment of Malaria.**—*Jl. Trop. Med. & Hyg.* 1929. June 15. Vol. 32. No. 12. pp. 165–169. [22 refs.]

The author treated 511 cases with plasmoquin or plasmoquin compound. Plasmoquin alone was employed in 159 cases. In common with other observers, he found that plasmoquin gave excellent results in the treatment of benign tertian and quartan malaria. It was noticed that patients suffering from chronic malaria who continued their usual working life tolerated plasmoquin better than in-patients. Abdominal pain and faintness during treatment were corrected or prevented if the plasmoquin was not given on an empty stomach. Adrenalin in solution was given to patients "who showed signs of suprarenal insufficiency" (arrhythmia ?).

The results of the treatment of mixed tertian infections was less satisfactory. Eight out of nine patients relapsed while they were under treatment. One patient showed signs of intoxication after receiving 0·26 gram of plasmoquin in three days. After the drug had been suspended for two days and the alarming symptoms had cleared away, 0·1 gram was given daily for two days. Its administration was again followed by intense haemoglobinuria and cyanosis; the finger nails and toes became black, the face and the skin of the whole body greenish, and the pulse irregular. The drug was stopped, the patient revived after an injection of glucose and adrenalin, and finally recovered from her malaria without further treatment.

Plasmoquin compound was given to 298 patients, the usual dose for adults being 0·06 gram of plasmoquin with 0·75 gram quinine sulphate daily. Children tolerated the drug excellently and its action in chronic sub-tertian infection "was most striking and gave results which could never be obtained with quinine alone." [It is hard to reconcile this conclusion with the admission that, in one of the reported cases, sub-tertian parasites were present after twenty-six days' continuous treatment with plasmoquin compound.]

W. F.

WALRAVENS (P.) in collaboration with VALCKE (G.) & BEQUAERT (M.). Observations concernant le traitement de la malaria par la plasmochine. [**Treatment of Malaria by Plasmoquin.**]—*Bruxelles-Méd.* 1929. June 16. Vol. 9. No. 33. pp. 939–943. [Hosp. & Lab. of Bact., Elizabethville, Belgian Congo.]

Malarial infections among the European population of Katanga are almost always due to *P. falciparum.* The writers treated fourteen cases with plasmoquin compound, giving six tablets a day for three periods of five days each, separated by intervals of the same length, and following this up by three similar courses of three tablets daily. The treatment was successful except in one case where there were alarming symptoms of intolerance, pallor, blueness of the lips, fugitive oedema of the face and feet, swelling of the veins of the feet, vertigo and headache. The parasites persisted in this case and quinine injections were given in place of plasmoquin.

W. F.

GREEN (Richard). **I.—The Treatment of "Crescent Carriers" with Plasmoquine Compound. II.—The Treatment of Quartan Malaria with Plasmoquine. III.—The Treatment of Malaria with Dimeplasmin.**—*Bull. Inst. Med. Res. Federated Malay States.* 1929. No. 3. 34 pp. With 1 coloured fig. [47 refs.]

——. **Treatment of Malaria with Dimeplasmin.**—*Lancet.* 1929. June 1. pp. 1137–1138. [1 ref.]

Part I. The examination of 250 Asiatic patients, who were undergoing routine treatment for subtertian malaria with 30 grains of quinine sulphate daily, in the District Hospital at Kuala Lumpur, made it evident to Dr. Green that this treatment was unsatisfactory from a public health point of view. The patients remained in hospital on an average for 7·1 days which was long enough to relieve their symptoms and to clear the blood of trophozoites but, as carriers of malaria, they were more dangerous than before treatment was begun; for while 50·4 per cent. had crescents in their blood on admission to hospital, 64 per cent. had crescents when they were discharged. To remedy this state of affairs, Dr. Green tried the effect of plasmoquin compound. Fifty-six Asiatics with crescents in their blood, weighing on an average 46 kg., were given tablets of plasmoquin compound equivalent to a daily amount of 0·04 gm. of plasmoquin and 0·5 gm. of quinine sulphate, with the result that the crescents disappeared within four to thirteen days, the average disappearance time being 7·9 days. In several of the cases, however, trophozoites persisted in spite of the treatment.

In a control series treated with 30 grains of quinine daily, no trophozoites were found later than the third day, but, in all cases, crescents persisted as long as the patient could be induced to remain in hospital. No toxic symptoms were found in this series of 56 patients treated with plasmoquin. Abdominal pains occurred in 3 cases, but appeared to be relieved by giving a large amount of fluid with the tablets. Slow pulse-rates occurred, but they were also noted in malaria patients under treatment with quinine and in a series taking neither plasmoquin nor quinine. Plasmoquin had no apparent effect on the blood pressure, and there was no evidence that it caused albuminuria. As the result of his investigation, Dr. Green concludes that a twelve-day course of treatment with 0·04 gm. of plasmoquin and 20 grains of quinine daily would be an advantage from an epidemiological point of view in subtertian cases with crescents in the blood. But he points out that it would cost twice as much as the present standard treatment in the Kuala Lumpur hospitals which consists of 30 grains of quinine sulphate daily, a course of twelve days' duration costing approximately eighteen pence. He considers that, in its present form, plasmoquin compound is not a well-balanced drug, because one cannot give sufficient quinine without giving too much plasmoquin. This difficulty can be avoided, but at some inconvenience, by giving the two drugs separately. He points out that in treatment with plasmoquin, continuous medical supervision is necessary in view of the narrow margin between the effective dose and the toxic dose.

Part II. The action of plasmoquin in quartan malaria was also investigated, by the administration of 0·06 gm. daily to 40 patients, with a control group on a daily dose of 20 grains of quinine. The young trophozoites disappeared within a few days in both series, but the gametocytes persisted in some of the cases on quinine treatment, whereas they were soon destroyed by plasmoquin.

Part III. Dr. Green has recently investigated the effect of Dimeplasmin in the treatment of malaria. It is said to be a synthetic remedy of the plasmin group made by the manufacturers of plasmoquin, who state that it has a destructive effect on the plasmodia of bird malaria, and is less toxic than plasmoquin. It is still in the experimental stage and is not on the market. In a group of eleven cases, comprising all types of malaria, the drug was found to have no effect upon the parasites or the symptoms.

W. F.

STERN (E.). Meine bisherigen Erfahrungen mit dem Plasmochin. [**Plasmochin Treatment of Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. May. Vol. 33. No. 5. pp. 273–276.

The investigations were conducted in Palestine where the author had a fairly large number of cases of malaria of all three varieties. [Exact figures are not given.] Blackwater fever is very rare. At first he gave 8 tablets of plasmochin = 0·16 gm. in the 24 hours. Some of the cases so treated had pretty marked cyanosis of the skin and visible mucous membranes. Also some complained of oppression over the heart and pain in the stomach. Since reducing the dose to 0·10 gm. for adults and 1–1½ cgm. for children he has had no cases of cyanosis or oppression. His experiences enable him to affirm: (1) That doses of 0·06 gm. per day for adults,,and 0·01 gm. for children cause rings to disappear from the blood and the symptoms to clear up after 2–4 days

treatment. (2) In 3–4 days treatment with plasmochin compound the schizonts and gametes of *Plasmodium falciparum* were markedly altered. (3) In pregnancy plasmochin is remarkably well tolerated. (4) Also nervous patients stand plasmochin much better than quinine. (5) The bitter taste in the mouth, the ringing in the ears, the tendency to faint, the urgent desire to micturate, which sometimes follows quinine administration, are not met with after taking plasmochin. The records of 4 cases are given.

E. D. W. Greig.

TANEW (I.) & HASCHNOW (G.). Zur Behandlung der menschlichen Malaria mit Plasmochin. [**Treatment of Malaria with Plasmochin.**] —*Muench. Med. Woch.* 1929. July 26. Vol. 76. No. 30. pp. 1243–1246. With 1 chart in text. [State Hosp., Burgas, Bulgaria.]

Over 200 cases partly in hospital and partly in private practice were observed. Most were chronic. The doses given were those recommended by Professor MÜHLENS, namely, plasmochin 0·02–0·09 gm. per day. In a few cases marked cyanosis was observed, also pain in the stomach without vomiting, and pain in the heart region. The secondary symptoms were noted particularly in nervous persons. In only 3 cases out of the 200 was it necessary to stop the plasmochin treatment. Blood examinations were made on each day of fever, thick films being used for the purpose. The following conclusions are reached: (1) In most cases plasmochin acts rapidly and certainly on the gametes. They disappear from the blood after 3 to 8 days of treatment. (2) On the rings, on the contrary, plasmochin has a weaker and slower action than quinine. (3) In blackwater fever plasmochin is particularly valuable, and also in cases of quinine idiosyncrasy. (4) The action of plasmochin on old-standing splenic enlargement is not better than quinine, and usually is not noteworthy. The action on splenic enlargement of recent origin is good. (5) In the prophylaxis of malaria it has great value by destroying the gametes in the peripheral blood. The histories of a number of cases of malignant and benign tertian malaria are recorded. Also the temperature chart of a case of blackwater fever is given.

E. D. W. Greig.

DE MELLO (Froilano). Indicações do emprêgo da plasmoquina na terapêutica e na profilaxia da malária. [**Plasmoquin in Treatment and Prophylaxis of Malaria.**]—*Bol. Ger. Med. e Farmacia.* Bastora. 1929. Jan.–Apr. Ser. 13. No. 1–4. pp. 9–16.

The author treated patients infected by the several parasites of malaria singly and in conjunction, and followed them up for a period of six months. The dosage and mode of treatment were those of MÜHLENS. He found that those who went to live in non-malarious districts had no recurrences; some of those who remained exposed to infection became re-infected (believed to be fresh infections) and in 17 per cent. the attacks recurred. He proposes a scheme for further study of the question: Two malarious districts, more or less isolated, to be chosen, of some 150–200 inhabitants; the nature of infection to be determined, antimalarial measures to be undertaken at the same

time, and the patients to be treated with plasmoquin compound and the effects noted until the end of the succeeding period of malarial seasonal prevalence.

H. Harold Scott.

MAJUMDER (A. R.). **Some Observations on Plasmochin.**—*Jl. Trop. Med. & Hyg.* 1929. Feb. 15. Vol. 32. No. 4. pp. 47–49.

The writer reports on a free supply of plasmochin which he obtained from the makers' local agent. In some cases it was given intramuscularly, the injection being painless. The dose is stated as being "0·03 gr.," but since two doses are held equivalent to "1 gr." the first figures evidently refer to grams and the second to grains. Intramuscular injection of "0·03 gr." daily for three days did not reduce the temperature to normal, but double this quantity appears to have done so. A child of 2½ years was inadvertently given within two hours "1 gr.—the adult dose . . . . . Luckily there were no symptoms."

C. L.

NISSENBAUM (B.). Zur Behandlung der Malaria mit Plasmochin. [**Treatment of Malaria with Plasmochin.**]—*Wien. Klin. Woch.* 1929. Mar. 7. Vol 42. No. 10. pp. 300–305. With 9 charts. [2 refs.]

The writer's conclusions on 100 cases are that plasmochin is an excellent medicament for tertian and quartan malaria, giving fewer relapses than does quinine. It is the first preparation which has been found to attack crescents and should replace quinine in idiosyncrasy and resistance to that drug, in pregnancy and perhaps in blackwater fever. Study of the body of the paper shows, in the heavy dosage used, deep cyanosis ; and that methaemoglobinaemia was not detected seems of minor importance in view of the fact that others have demonstrated its presence so conclusively.

C. L.

WIRSSALADSE (Sp.). [Plasmochin und seine Bedeutung in der Malariatherapie.] [**Plasmochin and its Significance in Malaria Treatment.**]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1928. Dec. Vol. 1. No. 2. [In Georgian script. German summary pp. 221–222.]

An experience of plasmochin in 21 subtertian, 31 tertian and 22 quartan cases leads to conclusions in general accord with the experience of others. Its success is held probably to be greatest in quinine idiosyncrasy and blackwater fever. Its toxic results make essential the closest individual scrutiny of those taking it and preclude its wide use. The many relapses which follow it indicate that it should be combined with quinine.

C. L.

RAYNAL (Jean). Traitement du paludisme par le quinio-stovarsol. [**Treatment of Malaria by Stovarsol Quinine.**]—*Marseille-Méd.* 1929. Mar. 15. Vol. 66. No. 8. pp. 361–424. With 27 charts. [3 pages of refs.]

These observations were made during the treatment of soldiers in hospital in Marseilles, most of whom had contracted malaria in Syria or Morocco. Quinio-stovarsol (oxyacetylamino-phenylarsinate of

quinine), first prepared by FOURNEAU and TRÉFOUEL, is manufactured by the firm of Poulenc Frères in the form of tablets each containing 0·25 grams. According to Dr. Raynal, it consists of stovarsol and quinine (54·9 per cent.) in approximately equal proportions.

The drug was given in three or four courses of 10 days' duration, separated by intervals of 5 days. The daily dose was 4 tablets, equal to 1 gram. These doses were well borne; but because slight symptoms of intolerance in the form of erythemata and giddiness occasionally arose, the author recommends careful watching and that a daily dose of 1·50 grams should not be exceeded. Quartan parasites disappeared within 60 hours, in the only two cases treated; whether they relapsed was not known. Benign tertian parasites, both schizonts and gametocytes, quickly disappeared; but 8 out of 10 cases relapsed during the course of a few months. The effect of the drug on the anaemia, the general condition of feebleness and the gastro-intestinal troubles of chronic cases was so excellent that Dr. Raynal recommends it in preference to either quinine or stovarsol alone. In sub-tertian malaria, schizonts disappeared within forty-eight hours under treatment, and crescents within 10 to 38 days. There were no relapses, in sub-tertian cases, after thorough treatment. In grave acute malaria, where immediate action is required, Dr. Raynal recommends treatment by injections of quinine salts. It is in chronic, cachectic malaria that he considers quinio-stovarsol of the greatest value.

W. F.

RUDOLF (G. de M.). **Sulfarsenol in Malaria.**—*Riv. di Malariologia.* 1929. May–June. Vol. 8. No. 3. pp. 260–261.

Three patients infected with benign tertian malaria by means of anopheline mosquitoes were treated with sulfarsenol in total amount varying from 66 to 84 centigrammes. The fever stopped and the parasites disappeared within a few days; but after periods varying from 21 to 204 days relapses occurred in each patient.

W. F.

ROW (R.). **The Fate of the Merozoites seen in the Cultures of Malarial Parasites.**—*Indian Med. Gaz.* 1929. Mar. Vol. 64. No. 3. pp. 142–144. With 4 text figs. [F. D. Petit Lab., Byculla, Bombay.]

It is held that the conditions unfavourable to culture of malaria parasites are specific serum reaction, phagocytosis, nutritional deficiency of serum, and toxic contamination; while the desiderata are vigorous parasites from a fairly fresh infection, glucosed serum unaltered otherwise, a fair supply of erythrocytes fairly rich in haemoglobin, freedom from leucocytes, and rigid asepsis.

C. L.

ROW (R.). **On some Observations on the Malarial Parasites grown Aerobically in Simple Cultures with Special Reference to the Evolution and Degeneration of the Crescents.**—*Indian Jl. Med. Res.* 1929. Apr. Vol. 16. No. 4. pp. 1120–1127. With 2 coloured plates. [5 refs.] [F. D. Petit Lab., Byculla, Bombay.]

Cultures obtained by the regular technique of Bass and Johns, and by all modifications of them, yield only one single first crop and no

satisfactory sub-cultures. The author therefore employs a simple aerobic method. Such cultures show that schizogony yields different numbers of merozoites at different stages of the disease. If the blood of a newcomer to a malarious district be cultivated during his first paroxysm, a large number of merozoites is formed; but, with each successive paroxysm, their number becomes less, until a time is reached when one merozoite entering one red blood corpuscle gives rise to no more than one merozoite of the next generation, and at this point gamete production begins. On the hypothesis that the ultimate disappearance of the crescent is due to the production of an antibody Dr. Row has prepared a vaccine from crescents. The results, in six cases, are shown in tabular form; the crescents disappeared within periods varying from four days to four weeks.

Coloured plates are given illustrating recovery from an attack of malaria, followed in cultures made from the blood at different stages. For example, a culture made during the second paroxysm, showing a schizont with many spores; a culture at the fourth paroxysm, in which the number of spores is much reduced; a culture at a still later stage, in which no schizonts have developed because immune bodies are present in the patient's blood. Another plate shows what is interpreted as the development of the crescent from the ring.

W. F.

HOROVITZ (A.) & SAUTET (J.). Remarques sur la culture des parasites du paludisme. [**Cultivation of Malaria Parasites.**]—*Ann. Parasit. Humaine et Comparée.* 1929. Mar. 1. Vol. 7. No. 2. pp. 151–160. With 1 text fig. [33 refs.] [" Salpêtrière " Hosp., & Parasit. Lab., Faculty of Med., Paris.]

Techniques for the culture of malaria parasites have become increasingly complicated, without giving better results. The writers describe a simple procedure with simple material which has given results comparing favourably with those obtained by the techniques of BASS & JOHNS (1912), ROW (1917), SINTON (1922), ROW (1928). They have found no evidence of increase in numbers of parasites in the cultures and no certain evidence of multiplication. The gamete stage is often attained. All three species of plasmodium were used.

C. L.

MULLIGAN (H. W.). **Studies on the Reticulo-Endothelial System with Special Reference to Malaria. Part I. Introductory. Part II. The Large Mononuclear Cells in the Peripheral Blood in Malaria.**—*Indian Jl. Med. Res.* 1929. Apr. Vol. 16. No. 4. pp. 1099–1106. [25 refs.]; pp. 1107–1119. With 1 coloured plate. [28 refs.]

Part I of this paper deals with the various physiological functions which have been attributed to the reticulo-endothelial system. It is intended, in a later series of articles, to study the relationship of these functions to malaria. In a historical survey, the author relates how the system of scattered mononuclear phagocytic cells, known as the reticulo-endothelial system, has come to be regarded as an organ with definite anotomical distribution and certain physiological functions. He

emphasizes the importance of the work of RIBBERT who, by a method of vital staining with lithium carmine, mapped out this system of highly phagocytic cells; those specially stained by this method being the endothelial and reticulum cells of the spleen, bone-marrow, and lymph-nodes; the Küpffer's cells of the liver; the reticulum cells of the thymus glands, certain connective tissue cells, and also the large mononuclear cells of the circulating blood. He sums up the functions of the system as being related to :—

i. Regulation of certain formed elements of the blood.
ii. Blood destruction and bilirubin formation.
iii. Chemotherapeutic action of drugs.
iv. Immunity and anaphylaxis.
v. Certain metabolic activities.

Within recent years it has been found possible by means of massive injections of Indian ink, colloidal suspensions, etc., to throw the reticulo-endothelial cells out of action; the effect being commonly known as blockage.

Part II of the paper reviews the opinions of different writers on mononucleosis and leucocytosis in malaria, and points out that the diversity of opinion with regard to them is easily understood when it is remembered that there is no unanimity as to the exact type of cell which should be recorded as a mononuclear. [The excellent figures given in modern text books, such as those of MANSON and STITT, have done much to remove this difficulty and to establish uniformity of practice in blood counting.] Captain Mulligan gathers from the study of the literature on the subject that there is no clear conception of the nature and origin of the mononuclear cells, and that, as most of the investigations have been made with Romanowsky's stain, further progress must take place along new lines. In view of recent observations, he employed: (*a*) the phagocytosis of carbon *in vitro*; (*b*) supra-vital staining with neutral-red and Janus green; (*c*) peroxydase staining with benzidine. Details of the methods are given. Two series of cases were examined—one suffering from acute and one from chronic malaria—the first consisted of young European soldiers suffering from chronic benign tertian malaria; the second consisted of Indian sepoys, and included cases of all three forms of malaria, mostly in the acute stage. As a result of these investigations, Captain Mulligan concluded that—The reticulo-endothelial cells in the peripheral blood are increased in both acute and chronic malaria. These mononuclear cells include clasmatocytes (mononuclear cells staining diffusely with neutral-red), monocytes (in which the neutral-red is aggregated in little rosette clumps within the cell), and also cells which give a positive peroxydase reaction. The increase in clasmatocytes was found to be less in chronic than in acute malaria.

W. F.

YANG (C. S.) & BERGLUND (Hilding). **Difference in Reticulocyte Behavior in Anemia from Malaria and in Pernicious Anemia.**—*Proc. Soc. Experim. Biol. & Med.* 1929. Mar. Vol. 26. No. 6. pp. 417–418. With 1 chart in text. [Peking Union Med. School, Peking, China.]

The authors examined a case of untreated tertian malaria with a red blood count of less than one million. Reticulocytes formed 23 per cent.

of the cells, which showed that the count was being maintained at this level by a lively blood regeneration keeping pace with the destruction wrought by the malaria parasites. In pernicious anaemia, with a similar number of erythrocytes, they found less than one per cent. of reticulocytes, showing that little blood regeneration was taking place; from this they argue that pernicious anaemia cannot be a haemolytic anaemia, as under such circumstances the blood count could not be maintained at this low level in the absence of regeneration. The administration of quinine in malaria sufficed to produce recovery by stopping the blood destruction. After five days' treatment eosinophiles increased from about 4 to more than 20 per cent., and similar eosinophilia was observed in pernicious anaemia when treated with liver extract.

W. F.

CORRADI (A.). La formula leucocitaria nel periodo d'incubazione della malaria sperimentale. [**The Leucocytes in the Incubation Period of Experimental Malaria.**]—*Policlinico.* Sez. Med. 1929. July 1. Vol. 36. No. 7. pp. 375–384. [2 pages of refs.] [Inst. of Clin. Med., Univ., Rome.]

It is generally held that a person who has recently suffered from malaria shows a leucopenia with a relative mononucleosis and that this is obvious after four to eight attacks. The author injected fairly large doses, 8–10 cc. of blood containing subtertian parasites, into three adults and examined smears of their blood at frequent intervals between the inoculation and the appearance of febrile attacks. He found that the change in the leucocytic formula preceded the onset of fever and was the first sign to appear, being present before any parasites were seen in the blood. He did not observe any difference in the conditions found in the blood of patients inoculated with parasites from individuals who had been treated with large doses of quinine and containing crescents, and from those injected with blood containing schizonts, the subjects having received small doses of quinine.

H. Harold Scott.

WOLSKI (M. E.) & SCHEWELEWA (E. M.). Die Blutmengebestimmung in Fällen mit vergrösserter Malariamilz. [**Estimation of Quantity of Blood in Cases of Malaria with Enlarged Spleen.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. May. Vol. 33. No. 5. pp. 269–273. [5 refs.]

As certain observers had found that the total quantity of blood was higher in diseases with enlargement of the spleen, the authors undertook the determination of the total quantity of blood in 51 cases of malaria with enlarged spleen. The degree of enlargement varied from one to six fingerbreadths. The method employed was that of Griesbach. They found that in healthy persons the total quantity of blood was 4·6 per cent. of the body weight. The results of the observations are set forth in two tables. The estimations showed that the total quantity of blood in these malarial cases was not higher than that of normal persons.

E. D. W. Greig.

BARBER (M. A.), KOMP (W. H. W.) & NEWMAN (B. M.). **The Effect of Small Doses of Plasmochin on the Viability of Gametocytes of Malaria as measured by Mosquito Infection Experiments.**—*Public Health Rep.* 1929. June 14. Vol. 44. No. 24. pp. 1409–1420. [12 refs.]

In these interesting experiments, which were conducted in the Panama Division of the United Fruit Company, the authors found that a very small dose of plasmochin quickly rendered a crescent carrier non-infective. Anopheles (*A. albimanus*) were fed upon five patients with crescents in their blood and in each case the mosquitoes became infected. One or two doses of plasmoquin were administered and, after an interval, mosquitoes were again fed upon the patients, but this time the results were always negative.

The following is an outline of three of the experiments :—

Case No. 1. Infected all the five mosquitoes fed upon him. He was then given 4 cgm. of plasmoquin and 22½ grains of quinine. On the following day, there was no decrease in the number of crescents, yet none of the mosquitoes which fed on him became infected. Fresh batches of mosquitoes were fed during the two following days with the same negative result though no more plasmoquin had been administered.

Case No. 2. Infected eleven out of seventeen mosquitoes. The same evening, he was given 5 grains of quinine, and on the following day 10 grains. On the evening of the following day he infected 4 out of 6 mosquitoes. On the morning of the third day he was given 1·5 cgm. of plasmoquin, and twelve hours later 16 mosquitoes were fed on him ; this time none was infected. The crescents had decreased but little in numbers, there was no change in their appearance, but they failed to infect. No more plasmoquin was given, and the feedings were repeated daily for the next three days, each time with negative results.

Case No. 3. Infected 4 out of 14 mosquitoes. He was then given a very small dose of 0·5 cgm. of plasmochin. No quinine was administered in this case. About 24 hours later, the number of crescents in his blood had increased, but though they were alive, as proved by their exflagellation in mosquitoes' stomachs, yet they failed to infect any which imbibed the blood containing them.

The authors consider it probable, in the light of their experiments, that a single dose of plasmoquin is effective on crescents for a period of several days, although rings remain in the blood ; and they suggest that the very small doses which have been found necessary could be safely used for mass treatment. They conclude that their " experiments indicate that amounts of plasmoquin within the limits of safety are effective against gametocytes, and may be combined with quinine (and caution) in the treatment of populations."

W. F.

SCHWETZ (J.) with COLLART (A.) & GEERNICK. **The Sporozoic and the Zygotic Index of the Anopheles of Stanleyville (Congo-Belge).**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Mar. 9. Vol. 22. No. 5. pp. 457–463.

The most numerous and widely distributed local anopheles species is *A. gambiae* (*A. costalis*). There also occur *A. nili*, *A. marshalli* var. *moucheti*, *A. funestus*, *A. obscurus* and *A. mauritianus*. The last two are

exceedingly rare. The first four transmit malaria. It was not previously known that the second and third did. The findings are as follows :—

	Numbers examined.	Percentage infected.	
		Salivary glands.	Stomachs.
A. gambiae	992	11·5	8·4
A. nili	132	5·3	10
A. marshalli var. *moucheti*	154	4·5	4·5
A. funestus	191	4·2	3·1

It is stressed that in isolated catches the percentage of infected mosquitoes is pure chance.

C. L.

i. HENRY (A. X. F.). Nouvelle technique de ferrofloculation pour l'étude sérologique du paludisme. [**Ferroflocculation in the Serodiagnosis of Malaria.**]—*C.R. Soc. Biol.* 1929. Mar. 8. Vol. 100. No. 9. pp. 671–674. [1 ref.]

ii. ——. Les méthodes photométriques de sérofloculation dans le diagnostic du paludisme (photométrie de la ferrofloculation). [**Serodiagnosis of Malaria by Photometry of Ferroflocculation.**]—*Ibid.* 1929. May 31. Vol. 101. No. 18. pp. 259–261. [2 refs.]

iii. ——. Le diagnostic du paludisme par la photométrie de la mélanofloculation. [**Photometric Serodiagnosis of Malaria by Melanoflocculation.**]—*Ibid.* pp. 261–264. [1 ref.]

i. Malarial sera have been found to give flocculation reactions with solutions of " metharfer," albuminate of iron and with suspensions of melanin. It is exceptional to find reactions of such intensity in diseases other than malaria, and therefore they may be reckoned as specific, although they will not do away with the necessity of microscopical examination of blood films. In general, albuminate of iron is intermediate in sensitiveness between the more sensitive melanin and metharfer. The test is as follows :—

(1) Set up a series of 6 tubes, each containing 0·2 cc. test serum. (2) Add to the tubes in their serial order 1 cc. of the reagents, 1–450 metharfer in double distilled water, 1–4800 albuminate of iron in double distilled water, 1–6000 albuminate of iron in double distilled water, double distilled water (control), 1–4800 albuminate of iron in 1–1000 salt solution and 1–1000 salt solution (control), respectively. (3) Place the tubes in the incubator at 37° C. for 1½ hours. (4) Read the results.

With positive serums the metharfer tubes show rather voluminous flocculi, while the flocculation is of a finer character in the albuminate tubes. Simple opacity, doubtful and slow reactions are to be rejected as non-specific.

ii. The " photometer " is an instrument capable of measuring slight variations of flocculation with very small quantities of serum. The test is set up with solutions of " metharfer " and of albuminate of iron in the same way as already described, but with the addition of the following control tubes, 1–450 metharfer, 1–4,800 albuminate of iron and 1–6,000 albuminate of iron in which the place of 0·2 cc. test serum is taken by 0·2 cc. normal salt solution. After being in the incubator

for 30 minutes the tubes are removed, shaken up, and the mixtures tested in the photometer for optical density. These mixtures are then returned to their tubes and replaced in the incubator for the set time required in the previously described flocculation test. Optical density readings according to the photometric scale in both metharfer and albuminate of iron tubes are positively diagnostic of malaria if high and of absence of malaria if low.

iii. In this test a suspension of melanin takes the place of the previously used "metharfer" and albuminate of iron solutions. The melanin suspension is obtained as follows :—

(1) Use the eye of an ox. (2) Remove the lens. (3) Scrape the choroid and collect the gelatinous material, containing melanin. (4) Add to this magma twice its volume of distilled water and grind up thoroughly. (5) Add formol as preservative (1–200). (6) Filter through lightly packed glass wool. (7) Centrifuge the filtrate sterilely for 8 minutes at 4,000 revolutions. (8) Keep the supernatant fluid in sterile tubes and in the ice chest. (9) Leave the suspension for a month to become stable before use.

W. F. Harvey.

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* With reference to the summaries of HENRY and of LE BOURDELLES & LIÉGEOIS in No. 5 of this *Bulletin* (p. 383) Dr. Henry has objected to the statements that the quantities of the dilutions are unstated and that the two other authors failed to confirm his (Dr. Henry's) findings. The position taken up by the two authors can be deduced from the summary of their later paper ; the reviewer's statement was verbally correct, but perhaps its brevity laid it open to misunderstanding. Dr. Henry makes the point that a serological reaction has not the precision of a chemical reaction. The summaries of his later papers will give a clear idea of his methods and their results.—ED.

LE BOURDELLÈS (B.) & LIÉGEOIS (R.). Sur la sérofloculation du paludisme. Les conditions de la réaction : facteurs non spécifiques de sensibilisation et facteurs spécifiques. [**Seroflocculation in Paludism. The Conditions of the Reaction: the Specific and Non-Specific Factors of Sensibilisation.**]—*C.R.Soc. Biol.* 1929. June 14. Vol. 101. No. 20. pp. 466–468. [4 refs.]

The authors carried out HENRY's flocculation test in 211 cases, with a melanin antigen consisting of a fine suspension of ground-up choroid. During an attack of malaria, 84 per cent. were positive ; in chronic malaria with splenomegaly, 65 per cent. were positive ; in non-malarial controls, 6 per cent. were positive. During the current year, 103 sera have been examined with an antigen prepared by HENRY which was very rich in melanin. In acute malaria, and in chronic cases with enlarged spleens, the reaction was always positive, but it was also positive in 25 per cent. of the controls. The results were read after four hours. Fine flocculation, tardy in appearance, and limited to one tube was classed as negative. In definite cases of malaria the reaction was usually rapid, coarse-grained, and visible in the distilled water and the salt solution at the same time. It is pointed out that there are non-specific as well as specific factors concerned in the reaction, the factors due to dilution with distilled water, to impurities in the antigen, and to colloids bearing different charges. The authors state that the reaction is one of time and degree.

W. F.

SABATUCCI (Mario). [Le reazioni di flocculazione nell'infezione malarica.] (**The Precipitation Tests in Malaria.**)—*Riv. di Malariologia.* 1928. Nov.–Dec. Vol. 7. No. 6. pp. 853–865. [21 refs.] [English summary p. 917.] [Inst. of Clin. Med., Rome.]

The author applied the Sachs-Georgi, Meinicke, Kahn, Muller, Sigma, and Wassermann tests in 23 cases of malaria, and concludes that malaria may sometimes cause slight positive reactions. In ten malaria patients and ten controls he employed Henry's iron methylarsenate test with positive results in six of the malaria cases and one of the controls.

W. F.

PICADO (C.). Nouvelle réaction sérologique pour le paludisme. [**A New Serological Reaction in Malaria.**]—*C.R. Soc. Biol.* 1929. Feb. 22. Vol. 100. No. 7. pp. 479–481. [San José Hosp., Costa Rica.]

The author examined 743 cases by the Hecht-Weinberg modification of the Wassermann reaction, employing the red cells of the rabbit in place of those of the sheep; adding, after one hour at 37° C., half the quantity of corpuscle-suspension which was capable of being lysed. At the same time, he put up a parallel series of tests in which a sugar solution was substituted for the antigen of the Hecht test. This solution consisted of 10 per cent. saccharose in distilled water, with double the volume of 0·9 salt solution. He concludes that a definite positive reaction in the saccharose solution combined with a negative Hecht test indicates almost certainly the presence of uncured malaria. This positive reaction he states can be changed to negative by treatment with quinine or plasmoquin. He also states that if both the Hecht and the sugar test are positive, it is necessary to give a test course of quinine (which would convert the sugar reaction to negative in the case of malaria) or a test course of novarsenobenzol (which would convert the Hecht test to negative in the case of syphilis). It is suggested that the reaction might be positive in kala azar and trypanosomiasis which the author has not had an opportunity of examining.

[The figures which are given do not support these conclusions very clearly. It appears from them that syphilis, as well as malaria, may produce a positive saccharose reaction, and so also may intestinal parasites such as amoebae, ankylostomes or ascarides. Consequently, the reaction is not likely to be of practical use in the tropics.]

W. F.

PEZZI (Giuseppe). La reazione di Gatè e Papacostas nella malaria. [**The Formol-Gel Reaction in Malaria.**]—*Ann. di Med. Nav. e Colon.* 1929. Jan.–Feb. Year 35. Vol. 1. No. 1–2. pp. 48–58. [39 refs.]

The formol-gel reaction was found positive in 95 per cent. of cases of malaria, so is of specific value, it is claimed, if leprosy, tuberculosis, syphilis, trypanosomiasis and kala azar can be excluded—rather a long list. It may be delayed for 48 hours and has no relationship to the intensity of infection.

C. L.

WAGNER-JAUREGG (J.). Einige Bemerkungen über die Impfmalaria. II. Die Bedeutung der Blutgruppen für die Impfmalaria. [**The Significance of Blood Groups in Inoculated Malaria.**]—*Wien. Klin. Woch.* 1929. Jan. 3. Vol. 42. No. 1. pp. 1–2. [11 refs.] [Summary appears also in *Bulletin of Hygiene.*]

All writers have been struck by the fact that patients treated with malarial inoculation very frequently develop a quotidian type of fever which may be awkward in a number of cases because the patient's strength, especially his heart, may be taxed unduly, having no time between attacks in which to recover. The method of inoculation does not affect the type of fever since a proportion of patients inoculated subcutaneously or intravenously with blood, or by mosquitoes develop quotidian fever. It is particularly frequent in paralytics and least so in secondary syphilitics. The author, after considering various possible explanations, thinks that the patient's constitution is the determining factor. In the blood used for inoculation are plasmodia in all stages of development, and in the receiver's blood they may come under the influence of forces which accelerate or retard their development, according to the case. WETHMER, following on work by WINDLBERGER on the influence of blood groups in this matter, found that what favoured most the development of quotidian fever was intravenous injection with blood not agglutinated by the receiver. This resulted in 46 per cent. pure quotidian and only 27 per cent. pure tertian after an incubation period averaging 4½ days. On the other hand, subcutaneous inoculation of a blood which was agglutinated by the receiver resulted in only 8 per cent. quotidian and 92 per cent. pure tertian after an incubation averaging 15·1 days. A fever which precedes the paroxysms of classical type has been noted by various observers. It is remittent and reaches only about 102° F., or perhaps a little higher, but lasts continuously from a day or so to three or four days. This type of preliminary fever occurred in all the cases treated intravenously with non-agglutinated blood and lasted an average of 3·7 days; it occurred in only 42 per cent. of the cases treated subcutaneously with blood of a group agglutinated by the receiver and lasted only an average of 1·2 days. The author thinks also that the greater frequency of the quotidian fever in paralytics is due to a peculiarity developed by the disease which favours the maturing of the plasmodia. [This may explain the cases in which quotidian fever follows inoculation by mosquitoes.] Thus by typing the receiver's and donor's blood one may determine to some extent the type of the fever, aiming naturally for the tertian type in the feeble patient.

L. W. Harrison.

HORN (Ludwig). Studie ueber die Malariaparasiten im verträglichen und unvertraglichen Serum. [**Research on the Malaria Parasite in Compatible and Incompatible Serums.**]—*Wien. Klin. Woch.* 1929. July 25. Vol. 42. No. 30. pp. 995–996. [7 refs.] [Neurol. Psychiat. Clinic, Univ., Vienna.]

On the suggestion of Professor WAGNER-JAUREGG the study of the fate of the malarial parasite in compatible and incompatible serums was undertaken. A drop of blood containing the parasites was cautiously mixed with a drop of incompatible serum (different blood group), then films were prepared; a similar preparation with compatible serum

(similar blood group) was made. Also films of the malarial blood without serum were made for comparison. The blood was taken from the patient at the height of the malarial attack, at the decline, and at various stages in the interval. The investigations showed that the benign tertian parasite of inoculation malaria underwent definite changes in the incompatible serum. The changes were partly a shrinking and breaking up of parasites, and partly the throwing out of processes by plasmodia which were no longer amoeboid. Other morphological changes were noted. No such changes were observed in the compatible serum. The observations are in agreement with clinical experience, because it is found that in an incompatible inoculation the incubation period lasts longer, since a great number of the parasites have been killed or more or less injured. WAGNER-JAUREGG considers the blood of cases of general paralysis offers particularly favourable conditions for the development of the plasmodium, and this explains the quotidian course of the malaria which is frequently observed after inoculation.

E. D. W. Greig.

MARGINESU (P.). Contributo allo studio dell'infezione malarica sperimentale. [**Studies in Experimental Malaria.**]—*Giorn. di Clin. Med.* 1929. June 30. Vol. 10. No. 9. pp. 575–576, 579–582, 585–587. [Hyg. Inst., Univ., Parma.]

This is an interesting paper. For his experiments the author injected intravenously amounts of 5 or 10 cc. of blood taken from a malarial subject during an attack of fever, and noted the period of incubation, the forms of the parasite in the recipients' blood, and the duration of attacks when left untreated. Within a few hours there was a slight rise of temperature, unaccompanied by rigors or sweating and due to the introduction of foreign protein. This usually lasted for 3–5 hours. The period of incubation before malarial attacks came on varied between one and twelve days. Of 18 subjects observed, 13 had an incubation of five days or less, only one as long as twelve days. This appeared to depend, not on the amount of blood injected, but was an individual peculiarity. 5 cc. were injected into each of four individuals, the whole 20 cc. being taken from a malarial subject at the same time ; the periods of incubation were 1, 2, 3 and 7 days. In five patients in whom it was less than two days, the donor and recipient belonged to different blood groups; those showing a period of 7–12 days belonged to the same group. In the first febrile attacks the number of parasites found in the blood was very small ; gametes were met with in most of the patients, sometimes early in the third access, at others at the sixth to eighth.

H. Harold Scott.

CIUCA (M.), BALLIF (L.) & VIÉRU (M.). Etudes sur l'immunité dans le paludisme. (Communication préliminaire). [**Studies on Immunity in Malaria.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* 1928. Dec. Vol. 1. No. 4. pp. 577–586. With 3 figs. [Hyg. Lab., Faculty of Med., Jassy, & Hosp. for Mental Diseases, Socola.]

The authors conclude, as the result of 297 observations made during the therapeutic inoculation of persons suffering from diseases of the nervous system, that immunity to malaria is not uncommon in a country

like Romania where the disease is prevalent and some 900,000 persons are infected. From 0·5 to 10 cc. of fresh blood containing benign tertian parasites was inoculated subcutaneously, intramuscularly, and intraspinally; if an inoculation proved unsuccessful it was repeated several times with the same, or another, strain of parasites, but in only 54 per cent. was the result positive. A group of 33 persons who resisted a first inoculation, all resisted a second, with one exception. Another group of 15 who had resisted two inoculations, all resisted a third. Autopsies made in 8 immune cases revealed no chronic malarial infection to account for the immunity. It was found, moreover, that, after an experimental infection had been cured, susceptible patients tended to become immune. For example, only 7 out of 23 who were cured of a first infection succumbed to a second inoculation, and all of these 7 were immune to a third. Second inoculations, in several cases, were followed by the appearance of parasites without symptoms, showing that partial immunity had been produced by the first attack; third inoculations were negative in such cases. Resistance to first inoculations of quartan malaria occurred less commonly (25 per cent.) than resistance to benign tertian, and this the authors attribute to the comparative rarity of the quartan form in Romania. The incubation in 23 persons, following quartan inoculation, was from 20 to 60 days, and almost always more than 30. Persons resistant to benign tertian were found to possess a slightly increased resistance to quartan, but there was no real cross-immunity between the strains. Twenty-five persons who were resistant to tertian or quartan malaria were inoculated with 4 cc. of blood containing subtertian parasites, with the result that 75 per cent. became infected after an incubation period of 5 to 30 days, showing that immunity to benign tertian or quartan malaria did not protect against the subtertian form.

[The immunity is probably to one strain of benign tertian, but it is not quite clear from the text whether this is the case or not.]

W. F.

MANSON-BAHR (Philip). **A Case of Resistance to Benign Tertian Malaria Infection.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Mar. 9. Vol. 22. No. 5. pp. 469–470. [3 refs.]

On a man of 46 who had lived most of his life in India and who had a Wassermann reaction strongly positive in serum, less so in cerebrospinal fluid, infected anopheles from Col. S. P. JAMES's stud were fed. No infection could be induced either thus or by subcutaneous and intravenous injections of malaria blood, even with the aid of protein shock.

C. L.

FISCHER (Otto). Zur Frage der näturlichen Uebertragbarkeit der Impfmalaria. (Beobachtungen am "Wiener Stamm." [**The Natural Transmission of Inoculation Malaria.**]—*Dermat. Woch.* 1928. Sept. 15. Vol. 87. No. 37. pp. 1292–1297. [12 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Blood with the Vienna strain of *P. vivax,* which is said to be gameteless and to exclude the possibility of risk of infection by mosquitoes, was sent to Hamburg. On arrival it contained bodies

with every appearance of gametocytes both male and female. When injected into men it regularly produced gametocytes, and when anopheles were fed on these men the insects became infected.

C. L.

SERGENT (Edmond) & SERGENT (Etienne). Vingt-cinq années d'étude et de prophylaxie du paludisme en Algérie. [**A 25 Years' Study and Prophylaxis of Malaria in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1928. June–Sept. Vol. 6. No. 2–3. pp. 117–434. With 148 figs.

The brothers Sergent have brought together, in one issue of the *Archives de l'Institut Pasteur d'Algérie*, notes of 25 years antimalaria work. Although the title of the volume refers only to Algeria, mention is made of similar French work in France, Morocco, Corsica and elsewhere. All the ordinary antimalarial measures are mentioned uncritically and some of them are excellently illustrated.

There is a long " Bibliographie analytique " made up, apparently, of the Sergents' own work only. The section of this dealing with blood examination has very little direct connexion with human malaria, concerning itself mainly with haemogregarines, trypanosomes and bird malaria.

As will be gathered from the above the book contains little that is new.

J. F. C. H.

PEREKROPOW (G. J.). Ein Fall von einhalttuender Wirkung der frischen Infektion mit Syphilis-Spirochäten auf die klassischen Anfälle im Verlauf der Malaria tertiana. [**Inhibiting Effect of Fresh Infection with Syphilis on Benign Tertian Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. Aug. Vol. 33. No. 8. pp. 432–439. [7 refs.]

The author's opinion, based on three cases which he describes, is that the favourable results obtained in the treatment of general paralysis with malaria must be ascribed not solely to the malarial parasite, but also to the combined therapy with salvarsan and quinine, although quinine alone cannot cure syphilis.

E. D. W. Greig.

ROBBINS (F. C.). **Rupture of Spleen during Anti-syphilitic Malarial Treatment.**—*U.S. Veterans' Bureau Med. Bull.* 1929. Apr. Vol. 5. No. 4. pp. 291–294. [U.S. Veterans' Hosp., Perry Point, Md.]

A man " given an intravenous inoculation of malaria " for tabes dorsalis had his first rigor on the seventh day ; these continued daily, but that on the thirteenth day was followed by acute abdominal pain. He died twenty-four hours later with the peritoneal cavity full of blood which came from a rupture an inch-and-a-half long at the lower pole of the spleen.

C. L.

ZIEMANN (Hans). Technik der Malariaimpfung bei Paralyse, Tabes, multipler Sklerose. [**Technique of Inoculation Malaria.**]—Reprinted from *Med. Welt.* 1928. No. 21 & 23. 13 pp.

The object of this paper is to present the subject in a form suitable for medical practitioners. The author considers that, whilst the value of inoculation and its results have been fully dealt with, the technique has been somewhat neglected. Consequently, in this communication only inoculation is discussed. He is of opinion that inoculation of malaria has been an immense boon to humanity.

E. D. W. Greig.

CLAUDE. Sur la création de centres de malaria-thérapie. [**The Inauguration of Centres for Treatment by Malaria.**]—*Bull. Acad. Méd.* 1929. Apr. 23. 93rd Year. 3rd Ser. Vol. 101. No. 15. pp. 501–503.

M. Claude suggested that owing to the difficulties experienced by medical men in many parts of France who wish to have patients, suffering from syphilitic diseases of the central nervous system, treated by the inoculation of benign tertian malaria, centres for such treatment should be established in various districts throughout the country. He considers that these centres should not be in lunatic asylums; or, if they must be so, they should form a separate voluntary section. On the proposal of the President of the Academy, M. CLAUDE's suggestion was referred to a Commission consisting of MM. CLAUDE, MARIE, SOUQUES, MARCHOUX, and BRUMPT.

W. F.

CARTRON. Recherches sur l'index endémique paludéen à Dschang et à N'kongsamba (Cameroun), en février et mars 1928. [**Endemic Malarial Index in Cameroons, February and March, 1928.**]—*Ann. de Méd. et de Pharm. Colon.* 1928. Oct.–Nov.–Dec. Vol. 26. No. 4. pp. 435–449.

Infection is predominantly with *P. falciparum*, next with *P. vivax*, rarely with *P. malariae*. The paper is mainly of local interest only. The microfilaria rate at 10 to 15 years of age was 60·8 per cent. of 46 examined. *Mf. perstans* was four times as frequent as *Mf. loa*.

C. L.

ROSS (P.). **Some Observations on Malaria and Helminthiasis in the Central Kavirondo Reserve adjoining Kisumu.**—*Kenya & East African Med. Jl.* 1929. Feb. Vol. 5. No. 11. pp. 367–374.

At 3,800 to 5,000 feet altitude malaria is prevalent, particularly the subtertian form. Judged by a single faecal smear ascaris and taenia are common, the hookworms less so, with trichuris, strongyloides and both schistosomes also present.

C. L.

CARTER (Henry F.) & JACOCKS (W. P.). **Observations on the Transmission of Malaria by Anopheline Mosquitoes in Ceylon.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1929. Feb. 13. Vol. 2. Pt. 2. pp. 67–86. With 4 text figs., 5 plates & 2 maps. [4 refs.]

A. culicifacies was the only mosquito found infected, and that to the extent of 81 of 1,639 examined. The spleen rate in places was as high as 100.

C. L.

SCHNEIDER (Johannes). Organisation und Erfolg der Malariabekämpfung in Palästina. [**Antimalarial Measures in Palestine.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Feb. 16. Vol. 111. No. 1/3. pp. 99–124. With 1 text fig. [20 refs.]

The writer notes the large amount of antimalarial work accomplished in Palestine from 1921 to 1926 with an accompanying fall in malarial incidence, features well known to readers of this *Bulletin*, and illustrated, to take a random example, by the fall in the spleen rate in Jerusalem from 44·4 in 1918–19 to 0·8 in November 1928.

C. L.

ERISTAWI (K.). [Zwei Fälle der traumatischen Läsion der Malariamilz.] [**Two Cases of Traumatic Rupture of Malarial Spleen.**]—*Nachrichten d. Tropischen Medizin.* Tiflis. 1928. Nov. Vol. 1. No. 1. [In Georgian script. German summary p. 113.]

Two cases of traumatic rupture of malarial spleens without visible external injury are described—both recovering after splenectomy. One suffered from tertian, the other from quartan malaria; the latter on the third day after operation had a malarial attack with plasmodia in the blood.

C. L.

BLANCHARD (M.) & PIN (M.). Rechute de paludisme six ans après le départ de pays d'endémie. [**Malarial Relapse 6 Years after leaving Country of Infection.**]—*Bull. Soc. Path. Exot.* 1929. Feb. 13. Vol. 22. No. 2. pp. 73–75.

In 1920 the man concerned contracted malaria microscopically established in Uganda. His subsequent travels were England 1922, New York 1927, England 1928, France 1928. Here he had a simultaneous bilateral pneumothorax produced for pulmonary tuberculosis and in December began to get high fever, and it was found that 70 per cent. of red corpuscles contained *P. malariae.*

C. L.

CARUSI (R.). Contributo al ricambio della creatinina. La creatinina urinaria nella malaria. [**Urinary Creatinin in Malaria.**]—*Policlinico.* Sez. Prat. 1929. Mar. 25. Vol. 36. No. 12. pp. 403–407. With 3 charts in text. [Inst. of Clin. Med., Univ., Rome.]

The writer's work leads to the conclusion that in malaria urinary creatinin is always increased. Its origin is at present uncertain, but animal experiment shows that there is relative and actual increase of creatinin in splenectomized animals.

C. L.

GIAUNI (Gino). La dilatazione dell'aorta nella infezione malarica. Interpretazione patogenica e osservazione di alcuni casi. (**The Dilatation of the Aorta in Malaria.**)—*Riv. di Malariologia.* 1929. Mar.–Apr. Vol. 8. No. 2. pp. 149–171. [22 refs.] [English summary p. 235.]

The author describes three cases of dilatation of the first part of the aorta in malaria. He states that this is not due to aortitis, but represents a protective effort for the maintenance of circulatory compensation, and occurs under the influence of the sympathetic nervous system.

W. F.

OTTOLENGHI (D.) & BROTZU (G.). Intorno all'eventuale azione di pasti eterologhi sullo sviluppo del parassita malarico nell'anofele. [**On the Effect of Heterologous Meals upon the Development of the Malarious Parasites in Anopheles.**]—*Riv. di Malariologia.* 1928. Nov.–Dec. Vol. 7. No. 6. pp. 849–852. [7 refs.] [English summary p. 917.] [Hyg. Inst., Univ., Bologna.]

The authors' experiments show that malarial infections in anopheles follow a normal course, no matter what animals the mosquitoes feed upon after being infected (cow, ass, sheep, guineapig, rabbit or pig).

W. F.

LEGENDRE (A.), MONDAIN (A.) & RAZAFINDRAMAMBA. L'action du quiniostovarsol sur le *Pl. vivax* chez les indigènes des hauts-plateaux de Madagascar. [**Action of Quinine Stovarsol on *P. vivax* in Natives of Madagascar.**]—*Bull. Soc. Path. Exot.* 1929. Feb. 13. Vol. 22. No. 2. pp. 137–140.

Seven cases are cited. Quinine stovarsol rapidly removed schizonts and less rapidly gametes of *P. vivax* from the skin blood.

C. L.

SEPULCRI (Piero) & VIDALE (Enrico). Autoemoterapia della malaria. (**Autohemotherapy in Malaria.**)—*Riv. di Malariologia.* 1929. Jan.–Feb. Vol. 8. No. 1. pp. 78–80. [English summary p. 110.]

The authors claim good results from autohaemotherapy in three cases of chronic malaria. They employed intramuscular injections of 10 cc. at different intervals, 9 to 16 times.

W. F.

ALONSO ALONSO (Luis) & GONZÁLEZ AZCUNE (Federico). Campaña antipaludica. Instrucciones, planes, órdenes, desarrollo, enseñanzas y deducciones clinicas.—*Medicina Países Cálidos.* Madrid. 1929. May. Vol. 2. No. 3. pp. 251–264.

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VAN DEN BRANDEN (F.) & HENRY (E.). Le paludisme chez les enfants indigènes à Leopoldville.—*Ann. Soc. Belge de Méd. Trop.* 1929. Mar. 31. Vol. 9. No. 1. pp. 37–43.

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REVIEWS AND NOTICES.

HOFFMANN (W. H.). **Das gelbe Fieber.** [Yellow Fever.]—*Kolle & Wassermann's Handbuch der Pathogenen Mikroorganismen.* 1929. Vol. 8. Lief. 32. pp. 419–500. With 7 text figs. & 2 coloured plates.

The last two years have seen such important advances in our knowledge of yellow fever, especially on the experimental side, that this new edition of the article on yellow fever appears at a very opportune moment, and the author has been careful to incorporate most of the recent work on the subject up to the end of 1928.

Concerning the history of yellow fever, the author inclines to the view that it was originally a West African disease and was carried to the West Indies during the Spanish slave trade of the seventeenth century, a view which is supported by the general history of the disease. The section on the etiology of the disease includes references to NOGUCHI's voluminous publications indicating *Leptospira icteroides* as the causative agent. As the author remarks, it is very difficult to explain these results, especially those dealing with the serological tests but Hoffmann believes that some of the guineapigs used in these experiments had latent infections of Weil's disease. In support of this view he mentions that one of his experimental animals developed a typical fatal attack of Weil's disease without having been inoculated. The description of the clinical symptoms is followed by a good account of the pathology of the disease and the histological changes are very well illustrated by a coloured plate, in addition to 2 text figures.

It is rather surprising that the section on immunity should contain no reference to the work of the French Commission, composed of MARCHOUX, SALIMBENI and SIMOND, in view of their important experiments on the protective value of immune serum.

The method of transmission is discussed in detail, and is followed by a discussion of the epidemiology of the disease. The opening sentence of this section indicating that transmission is effected solely by the bite of *Aedes aegypti* is a good example of the difficulties of keeping up-to-date in a subject of this nature, for whilst the article was in the Press other species of mosquitoes have been shown capable of transmitting yellow fever. Again, no reference is made to MARCHOUX and SIMOND's observations, especially their experiment recording the hereditary transmission of yellow fever to the offspring of infected mosquitoes. Although recent experiments on this question at Lagos have given negative results, it is a little premature to assume that such hereditary transmission never occurs, as it may require special conditions.

The article concludes with a summary of methods of combating the disease, and the dramatic results of anti-mosquito campaigns in Central and South America are strikingly illustrated in a chart giving the distribution of yellow fever in 1900, 1919, 1921 and 1925, respectively. In West Africa additional methods are required, and the author mentions the necessity for some means of vaccination. The work of the British Yellow Fever Commission in West Africa is not once referred to, not even in the section dealing with the epidemiology of the disease, nor in the account of the bionomics of *Aedes aegypti*. Possibly the fact that the reports of this Commission appeared during the earlier years of the war is to some extent responsible for the way in which their results have often been overlooked. It is difficult however, for an author to compress a subject of this nature into 80 pages without some omissions, and the article as a whole is a good accurate account of our knowledge of yellow fever up to the date of publication.

E. Hindle.

ROGERS (Leonard) [C.I.E., M.D., B.S. (Lond.), F.R.C.P., F.R.C.S., F.R.S., Major-General Indian Medical Service, Ret., Medical Adviser to the India Office.] **Recent Advances in Tropical Medicine.** 2nd Edition.—pp. x+439. With 16 text figs. 1929. London: J. & A. Churchill, 40 Gloucester Place, Portman Square. [12s. 6d.]

Demand for this book has necessitated a second edition in little over a year's lapse from the appearance of the first. The volume has been revised throughout, without sacrificing those historical parts which lent so much interest to various sections in the first edition: for the most recent of advances, however valuable, is best appreciated in relation to the indispensable work of the pioneers in that subject. The author himself has fruitfully pioneered. His distinguished original contributions to the modern science of tropical medicine fully ensured the interest of all workers in that branch of medicine in a volume wherein would be set out his selection of what was recent and advance. That interest was not disappointed; and it is clear that very many of his fellow workers have found this book useful also. In spite of here and there obvious signs of carelessness in proof reading, both interest and usefulness are enhanced in this second edition. In it the author has given us new sections on Oroya Fever; Verruga Peruana; Granuloma Inguinale; Climatic Bubo; and additional Helminthic infections. There are also some new illustrations. The best compliment to this book will be paid by the readers—who will surely expect and look out for, in due course of time, a third edition.

H. M. Hanschell.

DAUKES (S. H.). [O.B.E., M.D., D.P.H., D.T.M. & H., Director of the Wellcome Museum of Medical Science affiliated to the Bureau of Scientific Research.] **The Medical Museum. Modern Developments, Organisation and Technical Methods based on a New System of Visual Teaching. An Amplification of a Thesis read for the Degree of M.D. Cambridge.**—172 pp. With frontispiece & 44 figs. The Wellcome Foundation Ltd., Endsleigh Court, 33 Gordon Street, London, W.C. 1.

Dr. Daukes has made the subject of museum teaching so peculiarly his own, that a monograph from his pen automatically assumes authoritative status.

His volume covers the whole field of the teaching of medicine by visual demonstration, a system so diversely and admirably illustrated in the Wellcome Museum of Medical Science. Particularly valuable is the advice regarding the types of building, the equipment and staff required, together with a wealth of information on the methods of mounting and preserving museum specimens, which practical experience has shown to be best. To this technical matter is appended a comprehensive bibliography, amplified in many instances by summaries of the originals.

The author's defence of the graphic and synoptical method of teaching seems unnecessary, for anyone sceptical of its utility would speedily be converted by a visit to a museum organized on the lines advocated by Dr. Daukes, like Goldsmith's intending scoffers who remained to pray.

Finally, the work is rounded off by a large series of excellent photographs chosen so as to point the morals embodied in the text.

The Medical Museum will prove an invaluable book of reference. Furthermore, it will bring home to many readers the manifold advantages of the visual method of instruction, whether their interests are those of the teacher, the medical undergraduate, or the student of a larger growth.

W. P. MacArthur.

ROCKEFELLER FOUNDATION. **A Review for 1928** [VINCENT (George E.), President.]—54 pp. With 28 figs. & 4 maps. 1929. New York.

This is a particularly interesting report, since it gives us not merely an account of the doings of the year 1928, but also a review of the sixteen antecedent years and a prospectus of more varied and more extensive activities perpending under a new and more comprehensive order.

To take first the year 1928. That year the Foundation disbursed the immense sum of 21,690,738 dollars—about 4¼ million pounds sterling—of which a little more than 3 million dollars come under the heading of Public Health, more than 17 million under Medical Education, and the balance under miscellaneous headings which include various auxiliary sciences, and instruction in nursing. In the map of the World, upon which the distribution of this expenditure is imprinted, Europe, Southern and Eastern Asia, and the Americas from Canada to the Argentine are deeply scored, Africa is a blank except for two spots in the west, where research on yellow fever is in progress, and Australia also is blank except for two points in the south signifying biological researches and the grant of fellowships.

Of the money spent on Public Health, 2 million dollars went collectively on control of hookworm and malaria in many countries and of yellow fever in Brazil, on organized rural sanitation in the United States and other forms of service in many foreign countries, on emergency measures in the Mississippi flood districts, and on the public health organization of the League of Nations ; and about one million went to Public Health Education —under which heading are included building, equipment, endowment, or upkeep variously of schools and institutes of Hygiene in Harvard, Toronto, Brazil, Trinidad, London, Czechoslovakia, Hungary, Yugoslavia, and Fiji, and also a multitude of fellowships and other educational devices in public health.

Of the expenditure on Medical Education, the sum of 12 million dollars was taken from principal for the endowment (under certain conditions) of the Peking Union Medical College, for which institution, it will be remembered (see this *Bulletin*, Vol. 18, pp. 146, 147) the Foundation provided lands, buildings, and equipment, and has hitherto paid the upkeep, the present magnificent endowment being intended to clear the way for a final triumphant vision of the College as a through and through native institution. Other large sums have gone, severally, to the University of Brussels, the New York Academy of Medicine, the Sao Paulo Faculty of Medicine, and the University of Lyons, and smaller but substantial sums to medical institutions in Canada, Haiti, Cambridge, Edinburgh, Strasburg, Munich and other places in central Europe, Beirut, Siam, China, and Japan. Medical Fellowships—as distinct from those for public health—account for nearly 300 thousand dollars, and schools for the preliminary scientific studies for nearly 70 thousand.

Such are the bare figures for the year 1928. To give imagination further play we must think of them as a yearly recurring item in a " Record of Sixteen Years " here separately presented as prelude of a new stage in the evolution of the Rockefeller Foundation.

Apart from the distraction of the Great War (to aiding the medical needs and relieving the distress of which it devoted more than 22 million dollars) the efforts of the Foundation during these sixteen years have been concentrated on improving existing standards of public health all the world over. In this fine purpose fundamental stress has been laid on education, conceived so broadly as to include not only the health officer but also the medical man—both undergraduate and graduate—the biologist, and the nurse. Besides the very completely equipped Union Medical College in Peking, the Foundation has, in numerous towns in America, Europe, and Asia, established or expanded schools and institutes of public health, and has strengthened, in respect of departmental buildings,

laboratories, equipment, and professorships, numerous influential medical schools where research can be conducted in happy association with great hospitals; in several places it has founded or liberally assisted "pre-medical" schools where the biological sciences are independently studied, and training schools for nurses. Fellowships and scholarships also, in a comprehensive range and in liberal freedom of study, have been instituted on a great scale. In the sixteen years of its existence 3,187 of these fellowships have been granted to representatives of 58 countries, at a cost of nearly 5 million dollars, and 1,383 of the fellows have pursued their studies in countries other than their own. Furthermore, by visiting-commissions, surveys, and other such means the Foundation has promoted the training of health-officers in field-work and has accumulated valuable experience, and by pecuniary assistance to various useful publications it has generally facilitated study and research.

Of the Foundation's large schemes for the control of endemic disease the unending cosmopolitan hookworm campaign is well known. Its results have been chastening for the speedy optimist, but instructive for the Fabian; they have at least shown clearly how man may rid himself of the hookworm if—in the words of Portia—"to do were as easy as to know how to do." In its practical effect it has given temporary relief in many places, and has left in its wake—particularly in the United States—a multitude of rural health organizations which are described as "modest but complete"—and at any rate may be taken as well informed. The widespread antianopheles antimalaria operations and experiments to which the Foundation contributes both means and prestige will probably have similar results; undoubtedly they will be instructive and may awaken the thing known by the awful name of "sanitary conscience" in its sleeping-places, and "in suitable places" the methods favoured by the experts of the Foundation may give temporary relief; but one is inclined to think that one careful study of the history and the present conditions of some rural area where malaria has spontaneously disappeared without any dispossession of well-known malaria-carrying Anopheles or any destruction of their breeding-places, would be more informative than many studies of larvicides. Of the steadily-pressed offensive against the yellow fever mosquito the immediate and direct result may be described as spectacular. He would indeed be a curmudgeon who failed of applause; and yet there is something to learn from the recent tricky reappearance of the disease in Brazil. The last of the noteworthy items singled out in the "Record" is the anti-tuberculous organization built up by the Foundation in France during the War; this has been taken over by the French and incorporated in their Public Health Service.

From first to last the Foundation has spent on the undertakings here pictured in a flash-light the sum of 144,189,000 dollars.

The Record just noticed is prologue to a larger drama where the Rockefeller Foundation, as hitherto known, appears in union with the Laura Spelman Rockefeller Memorial as a new corporation under the old name, with increased resources. To the activities of the new Rockefeller Foundation will now be added the advancement of knowledge in social science and in the humanities. Its public health departments are to be administered by an International Health Board with seven directors, and the several subservient departments—the natural sciences, medical science, social science, and the humanities—each independently by a director. To the reviewer it has always seemed one of the distinctively excellent features of the Rockefeller Foundation as a philanthropic institution that in its "premedical" schools and in its grants-in-aid and fellowships for studies ancillary to Hygiene it early recognized the fundamental and perennial value of biology, since in biology the sciences that make for the improvement of the physical environment of the wonderful piece of work Man as "the paragon of animals" have their living roots (as distinct from their outward appurtenance and service). But within the physical conditions, which are amenable to skilled control, there is—far more intractable—an ethical

environment and an environment of the spirit, wherein the paragon of animals may appear now in splendid achievement as " the beauty of the world " and now in " quintessence of dust " as an unholy simulacrum, and it is there that the scale may be turned by the humanities, which, along with other fine discipline, tend to keep us mindful of the wisdom of the ancients and sensible of the magnitude of our debt to their achievements in civilization, alive to the lessons of the ages, and inquisitive of the trend of our own so predominantly material progress. Surely therefore, we may rejoice in the significance of the fact that a powerful scientifically-informed corporation, which has worked steadily for the improvement of the external physical conditions of the race, is now zealous to promote also the study of the humanities—that " ample page rich with the spoils of time," estrangement from which so pitifully freezes the genial current of the struggling soul.

A. Alcock.

Ross (Ronald) [Edited by]. **Letters from Rome on Certain Discoveries connected with Malaria,** by T. Edmonston CHARLES, M.D., Q.H.P., and Addenda, consisting of an Article by S. CALANDRUCCIO, Letters from Robert KOCH, & A. LAVERAN, and a Statement by Lord LISTER; edited, with a Preface & Remarks, by Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S.—78 pp. 1929. London.

These letters, together with the other matter which the Editor has introduced into the volume, refer to Ross's work on bird malaria and the unpleasant claims made by certain Italian workers headed by Professor GRASSI and BIGNAMI. The letters from Dr. CHARLES, previously printed for private circulation, are now on sale. The first letter is dated: Rome Nov. 4th, 1898, and shows that Dr. Charles was greatly interested in the work of discovery in connexion with malaria and wrote to Ross regularly up to January 14th, 1899. He was a link between the work in Italy and Ross and tells him what the Italians are doing and acknowledges receipt of Ross's preparations of bird malaria which were freely shown to GRASSI and others when they were beginning to publish their work and make claims strongly resisted by Ross and his supporters—see the letters from KOCH and LAVERAN and the statement by Lord LISTER. After 30 years it can serve no good purpose to re-open this unpleasant discussion in detail. Although Ross's work was practically finished in February, 1898, he had difficulty in naming his mosquitoes and it was not until he sent specimens to GRASSI that his dappled-winged mosquitoes were identified as *Anopheles*. The Italians claimed the first direct experimental infection of a healthy man. Similar experiments were carried out later in England. Dr. G. Carmichael Low went out to Italy and proved that it was possible to live, in a most malarious part of the Campagna, in a mosquito-proof house. He sent home infected mosquitoes with which Sir Patrick MANSON infected volunteers, thus putting a coping stone on the history of malarial discovery. Sir Ronald Ross has always received full credit for his work from his colleagues and has been amply rewarded, with honours, and financially.

The reprint of the article by Prof. Calandruccio is an attack on Prof. GRASSI as a zoologist. It is only worth notice on account of an amusing and not altogether creditable " postscript." Professor GRASSI obtained a Darwin medal from the Royal Society for work on termites and for researches, in collaboration with Prof. Calandruccio, on Leptocephalides Murenoides. Grassi wrote to Calandruccio that he could not give him half the medal and that he intended to stick to 1,000 francs of the award of 2,000 francs. The second 1,000 francs GRASSI claimed to cover expenses of their joint work!

J. H. Tull Walsh.

EWING (Henry Ellsworth) [United States Bureau of Entomology]. **A Manual of External Parasites.**—pp. xiv+225. With 96 text figs. 1929. London: Baillière, Tindall & Cox: 7 & 8 Henrietta Street, Covent Garden, W.C. 2. [20s.]

The known ectoparasites of the animal kingdom are a prodigious and a varied throng. They are recruited not inconsiderably from the protozoa (Acinetaria and Ciliata), the Heterocotylous flukes, and the marine leeches; occasionally from the Hydrozoa and Mollusca; and even from the inscrutable fishes of the deep sea—since the dwarfed and degenerate males of the oceanic Angler-Fishes (Lophiidae) have recently been discovered (by Tate REGAN) to be immovably-attached, unmitigated, and life-long ectoparasites of their obedient wives (a phenomenon more familiar among the Cirriped and Isopod Crustacea). But their stronghold is in the Arthropod phylum, where ectoparasitism flourishes among insects, and is full-blown in infinite variety among Crustacea and among Arachnida (mites and ticks).

The present little book touches but a part of this wide and—if we rightly regard the prospect—fascinating and edifying field of study. It confines its attention to the ticks, some of the mites (chiefly those parasitic on vertebrate animals), and some of the ectoparasitic insects—namely, the biting-lice (Mallophaga), the blood-sucking lice (Anoplura) and the fleas. Its outlook is predominantly taxonomic, so much so that of its 203 descriptive pages no less than 20 are devoted to the characterization of a multitude (31) of genera which are proposed as new in the author's schemes of classification. To propose and define new genera in a "manual" [which is by tradition a compilation] instead of in a scientific journal [or in an original monograph] is described by the author himself as "a practice that does not meet with the approval of some taxonomists." It is a proceeding, one hopes, that will never become a practice.

Of the 183 pages devoted to external parasites as such, 64 are assigned to mites, 25 to ticks, 37 to Mallophaga, 26 to Anoplura, and 31 to fleas. In each group the outstanding features are the comprehensive keys for the discrimination of families and subfamilies, and of genera but few of which are further noticed in the text or are of any interest except to the specialist in the taxonomy of a particular group. Distinctive external structural characters, life-histories, methods of control of forms of economic and pathogenous interest are very briefly sketched or outlined, but are not treated with the critical detail expected by the clientèle of this *Bulletin*. There are, however, plenty of good figures for the recognition of important genera, but the text is edifying chiefly for the systematist.

A. Alcock.

LEITCH (J. Neil) [M.D., B.S. (London), M.R.C.S. (England), L.R.C.P. (London), D.T.M. & H. (England), etc.]. **The Use of Standard Treatments in the Campaign against Disease in the Tropics.** With an Introduction by G. CARMICHAEL LOW, M.D., F.R.C.P., Senior Physician, Hospital for Tropical Diseases, London. Being a Thesis approved for the Degree of Doctor of Medicine in the University of London.—pp. xi+64. With 23 illustrations. 1929. London: H. K. Lewis & Co. Ltd. [6s.]

I suppose in the minds of physicians during all time there has been an attempt to formulate standard treatments. It matters little theoretically whether a series of cases present one symptom calling for a single line of treatment or whether the symptoms in another series are so varied as to require for their notation the formulae of permutations and combinations; standard treatments might in all cases be attempted. The idea lay at the bottom of the old blunderbuss prescription and forms an integral part of the theory of homoeopathy.

Obviously, however, the use of standard treatments is only a practical method when dealing with a disease which has an easily recognized symptom-complex, in which a diagnosis can readily be made by recognizing the causal organism or by some chemico-physical test, and for which there is a specific remedy. These factors, as pointed out by Dr. Leitch, are found in many tropical diseases. The second point which almost necessitates treatments being standardized when dealing with diseases among native populations, is their large numbers and the circumstances under which treatment has to be given. Malaria, kala azar, relapsing fever, yaws, syphilis, the dysenteries, cholera and helminthic infections have all been the subject of standard treatments, though the methods have varied considerably.

Dr. Leitch, called upon to treat large numbers of coolies on tea plantations, set out to test various standard treatments in some of the diseases above-mentioned, and this little volume gives the results of his experience. Knowledge so obtained is always valuable and for those called upon to deal with similar problems the book contains much useful information.

H. S. Stannus.

LEWIS'S MEDICAL & SCIENTIFIC CIRCULATING LIBRARY. **Catalogue. Part I. Authors and Titles. Part II. Classified Index of Subjects, with Names of Authors who have written upon them.** New Edition Revised to the End of 1927. 576 pp. 1928. London: H. K. Lewis & Co., Ltd., Gower St., W.C. 1. [15s. net. (To subscribers 7s. 6d. net.)] [Review appears also in *Bulletin of Hygiene.*]

The steady growth of Lewis's Medical and Scientific Circulating Library since its foundation in 1848 is proof that it successfully meets the need for a circulating library, open to subscribers generally, to supplement the often somewhat exclusive library facilities provided by medical and scientific societies. In contrast with these professional societies, few of which are able to maintain printed catalogues of their libraries, Lewis's Library publishes a catalogue of books for the convenience of its subscribers and contrives to keep this up-to-date in the intervals between new editions by means of printed supplements. A new edition of this useful catalogue, revised to the end of 1927, has just been issued. It is in two parts: Part I forming an authors and titles list, with entries under authors' names followed by the full title of book, number of edition, size, price and date of publication; Part II giving the authors' names classified under subjects, thus enabling a user by reference to Part I to obtain particulars of books of importance published in English dealing with any branch of medicine or science generally. The catalogue is carefully prepared and clearly printed and forms a handy and well-nigh indispensable work of reference for subscribers to the Library and for others wishing to ascertain what books have appeared in English on subjects coming within the scope of the Library. The value of the catalogue to these latter might perhaps have been increased by the inclusion of publishers' names, places of publication, notes of the number of pages for each book, and by the insertion of cross references where two or more authors are jointly responsible for a book, but these omissions are probably due to considerations of space and do not seriously detract from the general usefulness of the work.

R. L. S.